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**No. 525**

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### PROBLEMS WITH THE TECHNOLOGY OF COLORED CONCRETES

Moscow STROITEL'NAYA GAZETA in Russian 28 Sep 79 p 3

[Article by A. Grabel'nikov: "A Colorless Story: Why Colored Concretes Are Not Used"]

[Text] Now as before most buildings are erected of faceless, cold, gray concrete. Does this mean that decorative cement is not used in exterior panels?

According to documents of the Gosgrazhdanstroy State Housing Construction Trust, decorative cement is used for this purpose by more than 80 enterprises in the nation, including the housing construction combine in the city of Zhukovskiy, Moskow Oblast, and the Beskudnikovskiy Building Materials and Components Combine in Moscow. A closer look at the output of these combines revealed that they fabricate only panels with a white exterior coating. But what about other colors?

My question was answered by the Deputy Director of the Beskudnikovskiy Combine, V. Khaykin: "The capital's architects these days need no colored panels. They design buildings in the tradition of the ancient white-stoned Moscow."

But this answer is difficult to accept. Anyone who has toured the new rayons of the nation's capital--Troparev, Bibirev, Yasenev--knows that the buildings there are decorated in a gamut of colors. But because colored panels are not manufactured, the builders had to use large tiles, organosilicon enamels, and other expensive materials. What then is the reason why colored concrete is not being produced?

The Chief Engineer of the Zhukovskiy Housing Construction Combine V. Kukhorev offered yet another explanation:

"The production of panels with a colored exterior coatings would increase the production cost, and this is not convenient to the enterprise."

But this explanation also sounded unconvincing, because colored concrete is one of the most economical, industrialized, and progressive types of

finished products. The adjusted expenditures per square meter of decorative concrete are 1 ruble 66 kopecks compared with 4 rubles 53 kopecks per square meter of glazed ceramic tile and 4 rubles 59 kopecks per square meter of glass mosaics. Only synthetic wall paint is cheaper, but it is not durable, as it has to be renewed every 5 years. This was told to us at the Scientific Research Institute of Construction Economics.

The housing builders remained unfazed and advanced yet another explanation. It turns out that colored panels are not being manufactured chiefly because of the lack of quality phthalocyanin dyestuffs that do not get weathered by the sun. And indeed, such dyestuffs are scarce. The Soyuzanilprom All-Union Aniline Production Association satisfies only one-third of the related demand of builders. So then, must our housing districts remain monochrome and faceless just because of the lack of these pigments?

Not at all. The NIITsement [Scientific Research Institute of the Cement Industry] has developed a technology for producing red, yellow, brown, blue, green, and black cement on the basis of regular raw materials whose colors are not exactly bold but which on the other hand are impervious to sunshine and frost. Buildings decorated with such cements can already be seen in Chimkent and Alma-Ata.

But the housing builders advanced a new explanation: now they are not satisfied with the quality of the concrete, especially because of the encrustations forming on the panel surfaces. The Deputy Director of the Special Cements Laboratory of the NIITsement G. Chistyakov informed us that the encrustations can be averted by perfecting the technology of concrete production through the use of harder mixes, and Engineer P. Simanovskiy showed us tiles of colored concrete of superior quality produced by this method. It would seem that now the road is clear.

But suddenly the Chief of the Reinforced Concrete Laboratory of the VNIIZH-elezobeton [All-Union Scientific Research Institute of Industrial Technology of Precast Reinforced Concrete Structural Parts and Products], V. Sokolov took the side of the housing builders.

He said: "The samples you were shown were made in laboratory conditions and their in-plant mass production is not feasible. Vibrating equipment making concrete extremely hard is as yet unavailable."

Such a categorical declaration should have put to rest any doubts about the impossibility of using colored concretes in housing construction. But remembering that earlier comments by housing builders had conflicted with the actual situation, we decided to obtain yet another consultation on this problem.

The Deputy Director of the Design-Technological Bureau of the Glavmosprom-stroymaterialy Main Moscow Building Materials Industry Administration B. Gusev declared that rigid concrete mixes can now be produced under factory conditions with the aid of SMZh-460 low-frequency resonance machines whose series production has started this year.

Thus we established that there exist no insurmountable obstacles to the production of colored panels, with one exception--the evident unwillingness of the housing builders. The real situation is being obfuscated by all sorts of qualifications and evasive replies.

Why are the builders acting thus? The introduction of colored concretes requires certain efforts--the modernization of concrete-mixing facilities, the organization of additional facilities for unloading and supplying cement to the molding sites, and the expansion of warehousing facilities. Clearly, no one is willing to attend to this difficult and laborious task. It is much more convenient and restful to operate in the old-fashioned manner.

To a large degree, it is the architects, too, who bear responsibility for the unesthetic housing projects. In their designs they almost to a man fail to provide for facades of colored concrete. This was frankly admitted by the Deputy Director of the Architectural Design Bureau No 1 of TsNIIEP [Central Scientific Research Institute of Experimental Design], B. Blyumental'. Such an attitude of the designers is quite convenient to the housing builders and serves as a justification for their own inertia. As for the architects themselves, they justify their inaction by arguing that the production technology of colored concretes still has not been worked out at the housing construction combines. Such is the vicious circle within which both parties have enclosed themselves to this very day. And meanwhile monotonous gray buildings are springing up.

Is not it time to break this vicious circle? It would be only right for the designers to be the first to show initiative, since it is they who chiefly decide the outer appearance of buildings. Only their collaboration with the builders can add colors and brightness to the palette of our housing projects.

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### NEW CEMENT PRODUCTION LINE OPENED IN AKHANGARAN

Moscow STROITEL'NAYA GAZETA in Russian 14 Nov 79 p 2

[Article by I. Akhmetov, STROITEL'NAYA GAZETA Correspondent: "The Torch Is Ignited in the Kiln: Line No 210 Is Put Into Operation"]

[Text] On November 10 a cement production line based on a fundamentally new low-temperature (salt) technology was put into operation at the Akhangaran Cement Combine of the Uzbek SSR Ministry of Building Materials Industry. The line's capacity is 100,000 tons a year.

Now that this event took place, the first comment on the features of the new technology and its further prospects belongs to one of the authors of the new technology, the Deputy Director of the NIIStromproyekt [Scientific Research Institute for the Design and Planning of the Building Materials Industry], Nudel'man:

"The work done by a group of Tashkent and Moscow scientists on the physico-chemistry and technology of cement has been acknowledged as a discovery and introduced into practice. The Akhangaran line is only the first step on the road toward the mass use of the new technology. The principal element of this line is a 75-meter rotary kiln whose housing was assembled from standard components but which was equipped with extremely specific gear. The kiln is designed to produce high-grade clinker by means of low-temperature calcining. To this end a special system for preparing and proportioning the charge is provided and a special gas cleaning system to maintain purity of the ambient medium is installed. Furthermore, the line includes a desalinating system as well as a refrigerating facility, a slurry basin, pumps, grinding mills, and an engineering-laboratory building.

"What are the economic advantages of the new line? Its fuel consumption is 30-35 percent lower compared with the standard technology. This is due to the reduction of heat in the process of clinker formation, as well as to the reduction of the moisture content of the calcium-chloride slurry and to the improved heat insulation. Unit power consumption is reduced too, owing to the higher grindability factor of the clinker. The capacity of the heating and grinding facilities is increased by 15-20 percent and the production cost of cement is reduced by as much.

"This is nominally a pilot production line, but this does not mean that it will be used for experiments to master the new technology--that has already been sufficiently and definitely worked out. The principal purpose of the line at Akhangaran is rather, so to speak, to popularize the new method of clinker production, to graphically demonstrate the advantages of converting all cement enterprises to low-temperature technology.

"This discovery has already served as the basis for obtaining 49 patents, of which 30 were granted in the United States, the FRG, and France."

The Party Committee Secretary at the Uzbekshakhtostroy Mine Construction Trust of the Uzbek SSR Ministry of Construction A. Solov'yev made the following comment:

"The party local at the Trust and our entire crew are proud to have made a worthy contribution to building this pilot industrial line. The crews of the PMK-1, PMK-15, and PMK-18 [mobile mechanized columns] as well as the subdivisions of the republic's Ministry of Special Construction and Installation Operations worked splendidly to fulfill this responsible task. Special credit belongs to the Promtekhmontazh Industrial Technological Installation Administration of Trust No 93. The 'Zolot' Plant in Novorossiysk, the Metallist Plant in Vol'skiy, the Bekabadtsemremont Plant in Tashkent, and other plants took part in building and equipping the line."

On the occasion of the start-up of the line a ceremonial meeting was held at the Akhangaran Combine.

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### NEW CEMENT PRODUCTION LINE OPENED AT AKHANGARAN COMBINE

Moscow TRUD in Russian 26 Sep 79 p 1

[Article by G. Kryukov, Akhangaran, Uzbek SSR: "The Cement of Akhangaran: The Akhangaran Cement Combine is Readyng the Start-Up of the Nation's First Pilot Industrial Line for the Production of Alinite Cement"]

[Text] Standing side by side with the existing high-capacity kilns and refrigerating facilities, used to produce the traditional grades of cement, the new facility does not immediately strike the eye and looks unimpressive. This is surely why my guide, the Combine's Deputy Director for Capital Construction Ye. Taran, had first of all forewarned me:

"Please disregard the small size of this facility. Its start-up will be a turning point in the history of the production of building materials."

A team of scientists and specialists at the Tashkent Scientific Research Institute of Building Materials has developed a new grade of low-temperature salt cement--alinite. This cement displays various distinguishing properties and is inexpensive to produce. It is calcinable at 1,000-1,100°C, which is 500°C lower than in the case of conventional technology. Thus, upon a slight adaptation of the existing enterprises, output at each enterprise can be increased by a factor of one and one-half on using virtually the same facilities. Moreover, the cement then produced will markedly surpass in quality all the existing grades of cement. Alinite is stronger than the renowned Portland cement, and its intermediate product--clinker--is much softer than its counterparts, so that the productivity of grinding mills can be tripled.

Tests have shown that the new cement, which sets around metal reinforced cements, protects metal against corrosion and thereby improves the quality of reinforced concrete products.

Ye. Taran said: "The builders from the Mobile Mechanized Column No 1 of the Uzhekshakhtstroy Uzbek Mine Construction Trust had to overcome quite a few difficulties when assembling this new facility considering that it is one-of-a-kind and there was virtually no previous experience in building it. Look at that tower, called the scrubber. Inside it the batch will

be cleaned by the wet process to remove harmful impurities. While in the old technology we employed only one form of cleaning by means of electrostatic dust collectors, the new technology employs two-stage cleaning. This was done to make cement production maximally harmless. There will be quite a few other innovations included in this facility. And so that all of its elements may operate smoothly, a high precision of their assembling is required."

Despite the difficulties encountered by the builders of the new facility, they are resolutely determined to fulfill their pledges ahead of schedule and to start up this pilot line 3 months in advance of the plan-set deadline.

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### CLASSIFICATION AND APPLICATIONS OF CEMENTS

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 10, Oct 79 pp 17-20

[Article by N.M. Mikirtumova, Specialist, Department for Technical Norms and Standards, USSR Gosstroy: "Consultation: Classification of Cements and Range of Their Applications"]

[Text] As of 1 July 1979 the new state standard "Cements. Classification" (GOST 23464-79) has become effective. This standard was first developed by the cement and reinforced-concrete institutes NIITsement of the USSR Ministry of Building Materials Industry and NIIZhB of the USSR Gosstroy. The standard presents a unified classification of cement industry products. Its introduction will better substantiate the use of cement in design, research and planning work.

The standard establishes the following classification of cements by type of clinker and material composition, as well as the nomenclature of the cements made on the basis of Portland-cement clinker: without active mineral additives--Portland cement; with not more than 20 percent content of active mineral additives--Portland cement with mineral additives; with a granulated slag content of more than 20 percent--slag Portland cement; with more than 20 percent content of active mineral additives--Puzzuolanic Portland cement. The nomenclature adopted for cements based on alumina and high-alumina clinker was: alumina cement, high-alumina cement; and gypsum-alumina cement.

In addition, cements were classified by strength upon hardening as follows: high-strength cements--grades 550, 600, and higher; strong cements--grade 500; low-grade cements--below grade 300. They also were classified by hardening rate: standard cements with hardening after 28 days; rapid-hardening cements with hardening from 3 to 28 days; extra rapid-hardening cements with hardening within 24 or fewer hours. Further, they were classified by period of setting: slow-setting, with onset of setting after more than 1 hour and 30 minutes; normal-setting with onset of setting after 45 minutes to 1 hour and 30 minutes; and rapid-setting, with onset of setting within less than 45 minutes. Further still, they were classified by volume deformation on hardening: nonshrinking cements, cements expanding not more than 0.1 percent

after 3 days when tested according to GOST 11052-74; cements expanding more than 0.1 percent after 3 days when tested according to GOST 11052-74; stressed cements, rated according to self-stressing energy. They also were classified by heat release: low-thermal cements with a heat release of not more than 230 joules/gram ( $\sim$  55 cal/gram) after 3 days and not more than 270 joules/gram ( $\sim$  65 cal/gram) after 7 days when tested by the thermos method; medium-thermal cements, with a heat release of not more than 315 joules/gram ( $\sim$  75 cal/gram) after 7 days when tested by the thermos method. In terms of decorative properties they were classified as follows: colored cements, for which the color standards were specified; white cements, with a degree of whiteness amounting to at least 68 percent on the absolute scale. Finally they were classified in terms of resistance to sulfates, as specified by GOST 22266-76.

Appended to this Standard are rational ranges of application of the cements.

**APPENDIX: Rational Ranges of Application of Cements**

| Classificational Attributes of Cement     |   | Basic Purpose   | Can Be Used   | Not Recommended  |   |
|---|---|---|---|--|---|
| 1   | 2   | 3   | 4   | 5  | 6   |
| Based on Portland-Portland cement clinker | Portland cement, Portland cement with mineral additives | For concrete, reinforced-concrete, precast, and poured-on-the-spot structures   | For concretes with special properties on condition of additional verification of special properties of the cement | For frost-resistant concretes of grades upward of Mrz 200; for heavy concretes hardening at temperatures below +10°C in the absence of heating; for structures subject to alternating humidity and dryness | In concretes and structures with special properties without additional verification of the special properties of the cement                     |
| Mater-ial Compo-sition                    | Slag Portland cement                                    | For cured concrete and reinforced concrete precast elements and for poured-on-the-spot "massive" concrete and reinforced concrete above-ground, subter-ranean, and under-water structures exposed to fresh and mineral waters | Ditto   | Puzzuolianic Portland cement   | In frost-resistant concrete; on hardening of concrete under dry hot and cold conditions; under condi-tions of alternating humid-ity and dryness |

|                                    |                     |  |   |
|------------------------------------|---------------------|--|---|
| Based on alumina cement<br>clinker | Alumina cement      | For rapid-hardening concretes, emergency concreting operations, high-temperature concretes, and performance in the presence of sulfur aggression | In massive structures as well as in structures hardening at upward of +25°C   |
|                                    | High-alumina cement | For high-temperature concretes   | For grouting joints and funnels under operating pressures of up to 10 atm generated 24 hr after completion of grouting    |
|                                    |                     | For non-shrinking and expanding waterproof concretes and waterproofing facings   | For construction operations at subzero temperatures in the absence of heating; for structures operating at upward of 80°C |

|        |  |  |   |  |
|--------|--|--|---|--|
| Grades | <p>High-strength<br/>grades, 550,<br/>600, and<br/>higher</p> <p>Strong cement--<br/>grade 500</p> <p>Regular cements--<br/>grade 400</p> <p>Grade 300</p> <p>Low-grade ce-<br/>ments--below<br/>300</p> | <p>For concretes of<br/>grades of M500 and<br/>higher</p> <p>For concretes of<br/>grades M400 and M<br/>450, as well as of<br/>grades M300 and<br/>M350 with extra<br/>temper strength</p> <p>For concretes of<br/>grades M200-350 and<br/>M150, with extra<br/>temper strength</p> <p>For concretes of<br/>grades not more<br/>than M 150 and for<br/>mortars</p> <p>For mortars and con-<br/>cretes of grade<br/>M100 and less</p> | <p>For concretes of<br/>grades M400 and<br/>below M400</p> <p>For concretes of<br/>grades M200, M250<br/>and M500</p> <p>For concretes of<br/>grades below M200<br/>and mortars</p> <p>For concretes of<br/>grades below M200<br/>and mortars</p> <p>For concretes of<br/>grades no higher<br/>than M250</p> <p>For concretes of<br/>grade M150</p> | <p>For concretes of grades of<br/>grades of M400 and<br/>below M400 as well as<br/>for mortars</p> <p>For concretes of grades<br/>M400 and higher</p> <p>For concretes of<br/>grades below M250</p> <p>For concretes of<br/>grades below M250</p> <p>For concretes of<br/>grades below M250</p> <p>For concretes of<br/>grades M150 and higher</p> |
|--------|--|--|---|--|

| 1              | 2       | 3   | 4                                   | 5  | 6   |
|----------------|---------|---|-------------------------------------|--|---|
| Hardening rate | Regular | For all types of construction operations not requiring special hardening rates of concrete, mortar or product | Rapid hardening                     | For concretes in precast structural elements with high temper strength as well as for poured-on-the-spot concrete structures | For mortars   |
|                |         | For all types of construction operations not requiring special hardening rates of concrete, mortar or product |                                     | For precast reinforced-concrete structures with short-term curing  | For poured-on-the-spot concretes and precast reinforced-concrete structural elements subjected to standard curing |
|                |         |   | For emergency and repair operations |  | For concretes that must meet high requirements as to initial hardening rate under normal conditions               |
| Setting period |         |   |                                     | For concretes, mortars, and products with lengthy transport, stacking and molding cycle                                      | For concretes, mortars, products with normal and speeded-up cycles of laying and molding                          |

|   |  |  |   |
|---|--|--|---|
| Normal-setting<br>For all types of construction operations not requiring special setting rates  | For concretes, mortars, and products with delayed or speeded-up cycles of laying and molding | For concretes, mortars, and products with normal and delayed cycle of laying and molding | For concretes, mortars, and products with normal and delayed cycle of laying and molding  |
| Rapid-setting<br>For concretes mortars, and products with a speeded-up laying and molding cycle | For structural components of sulfate-resistant and frost-resistant concrete                  | For low-temperature concrete   | For conventional concrete not meeting requirements as to frost-resistance and sulfate resistance                                    |
| Sulfate-resistant<br>Sulfate-resistant Portland cement and the same with mineral additives      | Sulfate-resistant slag Portland cement and Puzzuolanic Portland cement                       | For sulfate-resistant concretes  | For frost-resistant concrete and for concrete subject to alternating moistening and drying without the adoption of special measures |
| Special properties  | Volumetric shrinkage-free deformation at hardening   | For concretes designed for poured-on-the-spot joints                                     | For conventional concretes  |

|                    |                              |   |                           |
|--------------------|------------------------------|---|---------------------------|
| Stressed           | For self-stressed structures | For concretes designed for poured on-the-spot joints                      | For conventional concrete |
|                    | For low-thermal concretes    | —   | Ditto                     |
| Heat release       | For medium-thermal concretes | —   | For conventional concrete |
|                    | For decorative properties    | For mortars and concretes designed for architectural finishing operations | —                         |
| Special properties | White and colored            | —   | —                         |
|                    | —                            | —   | —                         |

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### IMPROVED BUILDING REPAIRS AT LOWER COST

Moscow ZHILISHCHNOYE I KOMMUNAL'NOYE STROITEL'STVO in Russian No 9, Sep 79  
pp 16-17

[Article by V. N. Ladygin, RSFSR deputy minister of residential utilities and services]

[Text] Executive committees of local Soviets of People's Deputies and the enterprises and organizations of our ministries have been set the crucial task of achieving further improvement in the organization of capital repairs of residential buildings. This type of repair is an important component of the system of measures to guarantee preservation of the housing stock, to improve the indicators of its management, and to raise the level of amenities.

Large production and financial resources are assigned to restoring buildings to their original condition. These expenditures will be increasing, since there is a constant increase in the number of dwellings and their equipment is new and modern.

Improved utilization of resources and higher efficiency and quality of repair work constitute an overall national economic problem of great economic and social importance. The residential utility and service sector of RSFSR, which has a strong building repair industry, has been ordered to perform it. In RSFSR at the present time there are about 1,800 building repair administrations and sections comprising 140 trusts and associations. In order to satisfy the need for repairs to the fullest we are endeavoring to set up building repair organizations in every city and rural rayon. Repair teams of combines of utility and public service enterprises are working where these organizations have not yet been set up. In 1978 450 million rubles were spent on repairing housing and structures which are part of public services and amenities, and the same amount was spent to repair educational, health and cultural facilities.

The production capacities required to fully restore the housing stock and keep it in proper condition through preventive maintenance are available. Organizations and enterprises should make fuller and more efficient use of

those capacities to increase the volume and improve the quality of capital repairs. Most organizations could double the floor space of housing repaired by redistributing their personnel and equipment. Many collectives of repair workers have consistently fulfilled planned targets for housing repair. But in 1978 the plan for housing repair was not fulfilled by the trusts of Kalmytskaya, Karel'skaya and Tuvinskaya ASSR, Volgogradskaya, Kalininskaya, Arkhangel'skaya, Vologodskaya, Kurskaya, Kostromskaya and Sakhalinskaya oblasts, etc.

We should note that many of them are doing a great deal of new construction along with repairs. The share of new construction is 40 percent in the program of the Kostromskaya Oblast Trust, 62 for the Kalmytskaya republic trust, 50 percent for the Tuvinskaya republic trust, and so on. This has been one of the reasons why they did not fulfill their assignments for capital repairs of housing, which was referred to quite correctly in the decree of the RSFSR Council of Ministers entitled "On Measures To Further Improve the Management and Repair of the Housing Stock."

In future we must adhere strictly to those proportions between new construction and repair which are best justified, i.e., 30 percent new construction and 70 percent capital repairs.

Repair workers have acquired experience in setting up new organizational forms for management of building repairs which can be viewed as the beginnings of a unified building repair service. In 32 oblasts, krays and ASSR's unified centralized management entities have been organized in recent years--building repair associations. They embrace all the repair organizations of the industry which are in the oblast, kray or autonomous republic. The associations are conducive to more rapid technological and sectoral specialization, consolidation of small organizations and enterprises, creation of better conditions for efficient utilization of construction equipment and capital investments to develop facilities and raise the output-capital ratio of enterprises. At present more than 40 percent of the entire production program of building repair organizations is done with the resources of associations.

The effectiveness of the new organizational form is convincingly indicated by the experience of such associations as Krasnodarremstroy [Krasnodar Building Repair Association], Krasnoyarskremstroy, Stavropol'remstroy with an annual program exceeding 60 million rubles, Mosoblremstroy [Moskovskaya Oblast], Primorremstroy [Baltic Republics], Sverdlovskgorremstroy [Sverdlovsk city], and many others.

Completion of the process of consolidation is a very important direction in further improvement of the organizational structure of production; this means building from the organizations Rosglavremstroy, Rosgazspetsstroy and Glavblagoustroystvo [RSFSR Main Administration for Building Repairs, Organization for Specialized Construction of Gas Facilities and Main Administration for Landscaping, respectively] to form unified regional contractors in

the residential utility sector along with extensive development of sectoral specialization--creation of subdivisions for repair of the housing stock, of utility enterprises, and of social-, cultural-, and consumer-service facilities, as well as creation of trusts for laying external utility lines, for plumbing, for wiring, for road construction and for other operations. We see these organizational frameworks as strategies for implementing the decree insofar as it concerns creation of a unified building repair service.

The large and ever growing tasks of augmenting the volume and improving the quality of capital repairs of the housing stock can be performed only on the basis of scientific-technical progress. It is manifested most fully in the industrialization of capital repairs. The strategy of industrialization is the principal content of technical policy in the building repair sector. Raising the industrial level of repairs means increasing the use of prefabricated components, parts and assemblies manufactured off site, reducing manual labor and introducing efficient finishing methods. Industrialization of repairs should be a matter of everyday concern for every director of a building repair organization.

There is a tremendous potential for raising efficiency and improving quality of repairs by industrializing finishing work. The task lies in large-scale mastery and adoption of dry methods of finishing buildings by our trusts. The progressive construction of partitions consisting of gypsum panels set in a metal frame, which has been outlined for broad adoption in repair work, has great importance here. Enterprises are now making preparations for installation of rolling mills for manufacturing the elements of the frame. The designs and architectural solutions for these walls have been developed. Preparations are being made for large-scale manufacture of specialized tools and gear. In collaboration with the building materials industry we should in coming years master the production of gypsum panels and in 1980 apply at least 350,000 square meters of the new walls on repair projects.

The level of industrialization is raised further by the transition from on-site to off-site preparation of mortars, concretes, paint mixtures, carpenter's and roofer's stock, plumbing and wiring assemblies, by using efficient fabrications, and by making rational use of waste from woodworking and recoverable materials.

A great deal of experience has been gained in solving these problems in the Ufa and Saratov city trusts, the Krasnoyarsk association, Chuvashremstroy, the Leningradskaya Oblast Trust and elsewhere. However, in a number of ASSR's, krays and oblasts, such as Dagestanskaya, Kalmytskaya, Mariyskaya, Tuvinskaya, Udmurtskaya and Yakutskaya ASSR, and Arkhangel'skaya, Vologodskaya, Kirovskaya, Novgorodskaya, Sakhalinskaya and Ul'yanovskaya oblasts, public service authorities are not paying due attention to development and expansion of facilities. In these oblasts the rate of construction of production facilities is slow, and as a consequence the level of industrialization of repairs is low.

It is quite disturbing that the output-capital ratio has been dropping regularly in organizations in recent years. By comparison with 1970 the value of fixed productive capital of building repair organizations has almost doubled, and now exceeds 800 million rubles. Though the volume of building repairs has been growing, it is growing more slowly. Rosglavremstroy and directors of oblast utility and public service administrations, trusts and associations should analyze the work of industrial enterprises and take steps to bring existing facilities as close as possible to rated capacity, especially in the manufacture of reinforced-concrete products, woodworking, asphalt plants and other enterprises.

Improvement of the methods of economic operation has a large role to play in reducing repair costs. Remuneration of workers on the basis of the job contract or piece rates and bonus, as well as subcontracting are being used ever more widely in building repair organizations. At the present time about 200 crews are operating according to the method of N. A. Zlobin.

Residential utility and building repair organizations should greatly increase the number of imitators of the Zlobin team, especially among those doing capital repairs of housing.

More and better repairs at lower cost are the basic aims in improving activity in the field of capital repairs of the housing stock.

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### REVIEW OF HOUSING CONSTRUCTION

Moscow STROITEL'NAYA GAZETA in Russian 21 Oct 79 p 1

[Editorial: "The Housing Construction Assembly Line"]

[Text] Our country's housing construction assembly line is unequaled in its scale. This year alone 11 million people improved their housing. This is yet another step toward solving the very important social problem of providing every family a separate apartment.

The comfort and quality of our dwellings are also improving. More than 40 percent of residential buildings are today being built from new standard designs. In these houses there is a convenient floor plan, improved utilities, and better interior finishing. For the first time in housing construction practice the collective of Housing Construction Combine No 3 of Glavmosstroy has set itself the task of meeting the superior quality standards not only in custom-made houses, but also with houses built from standard designs. And they have achieved their first success: 16 standard-design buildings in the new series built in the Olympics Village were certified "excellent." Moreover, the housing complex was put into service 3 months ahead of the deadline.

It is no accident that high rates of construction of residential buildings and excellent quality of performance of all principal operations have accompanied one another. The components of a fast pace and excellent quality are one and the same: efficient organization of work at the construction site, uninterrupted supply of good-quality materials, discipline and responsibility, mutual aid and mutual emergency assistance by all participants in the process of construction.

A reliable way of ensuring a smooth pace in urban development is the method of 2-year construction on a flow-line basis, in imitation of the Orel method. The essence of this method is to compile a 2-year plan for opening housing to tenancy on the basis of the 5-year program and master chart of the city's construction, instead of an annual plan. The 2-year plan is divided into two stages: the work plan and the preparatory plan. At the end of every year the plan is drafted for the subsequent 2-year period, but now the preparatory stage becomes the principal and completion stage.

The virtue of this system is that the construction process passes smoothly from one year to the next. There is no need to wait for title lists to be compiled and approved from scratch, for contracts to be concluded, for forms to be filled out on allocations of materials and equipment, for funding to be provided. All of these problems can now be solved in the preparatory stage. The construction workers are in a position to do spadework in an effective way and to prepare project plans and estimates in good time. Thanks to creation of a system in which there is a single client, a single contractor and a single project planner, it is possible to overcome such age-old diseases as scattering of capital investments and "unfinished construction" and to improve the comprehensiveness of urban development.

In Orel they have managed to achieve uniform delivery of housing as well. Last year they delivered 23 percent in the first quarter, 26 percent in the second, 25 in the third and 26 percent in the fourth. They are working uniformly in Orel this year as well. Improved quality of housing construction is accompanying the smooth pace: almost all the buildings are receiving grades of "good" and "excellent."

Housing is being built in Moscow, Ryazan', Cheboksary and Yaroslavl' on a continuous assembly line from project planning to construction. A total of 120 cities have now begun to imitate the Orel example. This method is being adopted most successfully in RSFSR. In all the capitals of its autonomous republics and in many kray and oblast centers coordinating centers have been set up and comprehensive steps have been worked out to organize the unbroken assembly line from project planning to construction. The interdepartmental coordinating council of RSFSR Gosstroy is vigorously promoting development of this process. Work is going particularly well where the Orel method is being supplemented and enriched by adoption of crew cost accounting.

But this method, which has demonstrated its economic effectiveness, is still being introduced rather slowly in the country as a whole. According to the data of construction ministries, only 12 percent of the housing is being built by this method. And even among cities where the decision has been made to adopt the new method, the entire set of measures required by the continuous assembly line from project planning to construction has not been carried out everywhere by any means. For example, the opinion is rather widespread that it is sufficient to concentrate most of the money in the hands of gorispolkoms so that introducing the "assembly line" does not involve much trouble. However, this is only one of the necessary conditions.

The instruction for achieving flow-line construction of housing and cultural- and consumer-service facilities in cities, which was drafted by Gosgrazhdanstroy, took effect as of 1 January of this year. The publication of this normative document superseded many departmental instructions and regulations and defined a unified set of project planning and engineering documents, including a binding schedule for flow-line construction for the city as a whole. It calls for a faster pace in preparation of sites for construction and project plans and estimates and consistency in the construction of projects. Practical assistance is to be extended in preparation of

these documents by the Central Scientific Research, Planning and Design Institute of Urban Development, NIIOUS [(?) Scientific Research Organization for Organization and Management of Construction] of the Moscow Construction Engineering Institute imeni V. V. Kuybyshev, and other scientific research and project planning institutes.

There has long been a need to strengthen the service of the sole client--capital construction administrations of city Soviets of People's Deputies, and to put order in their organizational structure, staffs and the material incentives of staff members. Only then will they be able to replace the corresponding divisions of enterprises. There is a need to put in order the relations between the sole client and those who have a share in the project. Much depends on USSR Gosstroy and the USSR State Committee for Labor and Social Problems in solving these problems.

The smooth pace of the housing construction assembly line is determined by continuity in material and technical supply. All those involved in this work should study more thoroughly the demands of consumers, strengthen performance discipline, and move material resources about efficiently. Comprehensive competition of supporting industries on the principle "Worker Relay" is expected to play a large role in performing this task.

It is equally important to adjust the mechanism of project design and planning to the 2-year scheme. The first thing this requires is increasing the limit so that the preparatory program can be carried out in full accordance with the 2-year plan.

The decree of the CPSU Central Committee and USSR Council of Ministers on improvement of the economic system is aimed at more comprehensible and thoughtful drafting of 5-year and annual plans on the basis of economic and engineering computations. As an integral part of 5-year plans, the Orel 2-year plan is aimed at unconditional fulfillment of the assignments set both for the current year and also for the 5-year period as a whole and at the speediest achievement of the end result--delivery of projects for use.

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### INDUSTRIALIZED HOUSING CONSTRUCTION

Moscow SEL'SKAYA ZHIZN' in Russian 5 Oct 79 p 2

[Article by V. Vid'manov, chairman of the board of the association Roskolkhozstroy]

[Text] Successful fulfillment of the program outlined by the July (1978) Plenum of the CPSU Central Committee for further development of agriculture presupposes that party, Soviet and trade union organizations and economic entities turn their attention more sharply to reorganization of rural areas and to improvement of the housing and cultural and consumer services of rural workers. An important part of this activity is to expand the volume and improve the quality of housing construction. Whereas in the 3 years of the 10th Five-Year Plan interkolkhoz construction organizations of RSFSR delivered dwellings for tenancy with a total area of about 4 million square meters, in 1980 alone about 2 million are to be built, and the volume of housing delivered is to be brought up to 4 million square meters by 1985. The way to achieve this goal is to put housing construction on an industrialized basis as fast as possible.

In a recent meeting of the engineering council of the association Roskolkhozstroy which was held in Penza the personnel of the system were given a specific task: to raise the level of full prefabrication of urban development projects to be carried out next year to 50 percent and to reach a level of 80-85 percent by the end of the 11th Five-Year Plan. However complex the goal which has been set, it is the general opinion that it is attainable, since it is actually the culmination of many years of efforts by interkolkhoz organizations to strengthen their production capability and to raise the technical level of construction.

In just 3 years of the current 5-year period 670 million rubles have been invested to develop the industrial facilities of the system, and more than 100 major industrial enterprises have been built for the production of building materials and fabrications. In all we now have 402 enterprises manufacturing prefabricated reinforced-concrete products with a total annual output of 6 million cubic meters. The principal task is to achieve full utilization of the capacities that exist and to overcome the situation where

in a number of oblasts--Orlovskaya, Gor'kovskaya, Volgogradskaya, and Orenburgskaya, as well as Altayskiy Kray, Tatarskaya and Dagestanskaya ASSR--many enterprises which have been built are operating at half capacity, though the orders of kolkhozes for housing construction are not all being filled.

A thorough analysis of the reasons indicates convincingly that the matter is not so much oversight by individual workers as organizational oversights, whose correction has been suggested by the decree of the CPSU Central Committee and USSR Council of Ministers entitled "On Improvement of Planning and Enhancement of the Impact of the Economic System on Raising Production Efficiency and Improving the Quality of Performance." The tasks that have been set are giving an impetus for speeding up in every way adoption of progressive forms of organizing the construction process in rural areas, and especially the performance of work by SSK's [rural construction combines].

At present there are 28 rural construction combines (housing construction combines) in the republic's interkolkhoz organizations; not only are they responsible for off-site manufacturing of fabrications with a high level of factory readiness, but also for using them to build projects ready for service. The total capacity for production of large-panel housing construction has reached 711,000 square meters. In the 11th Five-Year Plan there will one or two such combines in every oblast, kray and republic association. It is their activity that will begin to determine the rates, volumes and quality of comprehensive development of kolkhoz and sovkhoz settlements. It is therefore clear how important it is to support the advanced know-how, which, though negligible at present, is accumulating, and to learn how to overcome operational shortcomings so that the errors of the initial period are not repeated at the new combines.

The Saratov rural construction combine last year erected and delivered for operation dwellings with a total area of 40,500 square meters; in other words, it fulfilled more than half of the housing construction program for the association. Then there is the Pogrebskiy housing construction combine of the Bryansk association, which was put into operation in 1974, and in 5 years has attained only 8 percent of its rated capacity. This is an up-to-date large-panel housing construction operation with a capacity of 50,000 square meters of housing per year. Actual output is 5,000-6,000 square meters. The situation is similar at the Livenskiy DSK of the Orel association, the Ilanskiy DSK of the Krasnoyarsk association, and a number of others.

We might explain the situation by saying that the enterprises were put into operation though major parts of the construction and manufacturing equipment were not finished, that indeed they were not completed for years afterward, that the capacities available in many associations are not being furnished everything needed for normal operation, that in certain cases the list of products produced is extremely long. But no sort of explanations can justify the situation that has come about.

The engineering council has drafted additional measures so that every enterprise reaches its entire rated capacity before the end of 1980. Particular attention is to be paid to production and erection of buildings on the basis of the improved plans of series 25 and 135, whose architectural and layout features come closest to meeting present demands for a rural dwelling. When we say "closest," this does not signify "full satisfaction." The staff of the design bureau for reinforced concrete of RSFSR Gosstroy has persistent work ahead of it so that project planning keeps pace with the way people live.

The specific nature of housing construction in rural localities defeats the one-solution approach in selecting the type of construction for buildings to be built by the industrialized method. Full prefabrication is possible with other methods and reinforced concrete. Wood houses are 7 percent more economical than reinforced concrete in terms of the cost per square meter of total space, 30 percent more economical in terms of labor intensiveness (on site and off site), and they consume less than one-sixth as much steel. In our view it is wood which should have the decisive role in low-level housing construction.

The system of the association Roskolkhozstroy possesses a sufficient amount of this material. But up to now wood fabrications for housing have been manufactured primarily on a small workshop basis. There is a vital need for a very rapid transition to factory wood housing construction. To that end a decision has been made to set up the relevant industrial production associations specialized in manufacturing and erecting industrialized residential buildings. In Penzenskaya Oblast such an association is operating with the facilities of the Chaadayev Combine of Fully Prefabricated Housing Construction. In 1980 construction will be completed on the Novoaltaysk Plant for Fully Prefabricated Housing Construction, which will be manufacturing houses of the same kind. Then such associations are to be set up in Chuvashskaya and Mordovskaya ASSR and Kostromskaya, Gor'kovskaya and a number of other oblasts.

But we are also counting on using a number of other materials whose effectiveness has been proven. One of them is arbolite. It is obtained from a mixture of an organic filler, an inorganic binder and water. The fillers may be sawdust from sawmills, tow and hemp. The cost per square meter of arbolite wall is 5 rubles less than brick wall and 6 rubles less than keramzit-concrete wall.

The board of the association Roskolkhozstroy has approved a long-range special-purpose program for arbolite; according to this program, in 23 associations there will be new construction and reconstruction of plants and shops to bring the capacity for production of industrial fabrications of arbolite, mainly for housing construction, up to 470,000 cubic meters per year. This will make it possible to build 6,000 houses of the homestead type every year from this material. The economic benefit from adoption of these fabrications is 10-12 million rubles per year. The problem of adopting arbolite

fabrications in everyday practice is now under the constant eye of the board.

The course toward industrialized housing construction does not, of course, signify that less attention will be paid to construction from traditional materials nor to other problems crucial to success in rural housing construction. We cannot but be disturbed by the fact that in the system as a whole the volume of nonproductive construction still has a negligible share in the overall program of construction and installation work. In the Bryanskaya, Mariyskaya, Mordovskaya, Chuvashskaya, Belgorodskaya, Voronezhskaya, Volgogradskaya and Bashkirskaya associations they do not exceed 4-5 percent of the total program of contract work. This manifestly calls for serious readjustment. Many oblast, kray and republic (ASSR) associations are still not fulfilling plans for completion of housing. At a number of sites production know-how is low, and building standards and rules are violated. Sometimes the quality of construction suffers because of the low quality of materials and products. Many brick plants are still manufacturing products which do not meet state standards.

Unevenness in delivery of projects for service has an extremely adverse effect on the quality of construction and installation. In the system as a whole less than 10 percent of the total area was delivered last year in the first quarter, while 35 percent was delivered in the fourth quarter. These proportions have persisted this year as well, and the result is the "storming" approach. The boards of interkolkhoz organizations are expected to join the kolkhozes and sovkhozes which are the shareholders and local Soviet authorities in achieving uniformity in the delivery of housing. Adoption of the know-how of Orlovskaya Oblast with continuous 2-year planning can even now be a reliable way of solving the problem. At the same time more vigorous preparations should be made for fulfilling stable 5-year plans of capital construction (with a breakdown of the assignments by years), which will be approved beginning with the 11th Five-Year Plan. This measures, envisaged by the recent decree of the CPSU Central Committee and USSR Council of Ministers, is undoubtedly playing a decisive role in improvement of rural housing construction.

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

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### BRINGING NEW PLANTS ON-LINE EXPEDITIOUSLY

Moscow EKONOMIKA STROITEL'STVA in Russian No 11, Nov 79 pp 3-8

[Article by A.M. Tokarev, USSR Minister of Industrial Construction: "The Main Task -- Bringing Facilities and Plants On-Stream"]

[Text] Each year gigantic construction programs are carried out in this country. And their scope and scale are steadily growing. Hundreds of billions of rubles are allocated for capital construction. Approximately 12 million persons are employed in the construction sector, and a colossal quantity of material resources is involved. It is obviously important skillfully to manage such impressive resources and to utilize more efficiently each and every ruble of capital spending. Hence the strategy line of all participants in construction -- to transform capital spending into ready assets more rapidly: operating enterprises, auxiliary facilities, finished housing, and sociocultural facilities. It is important to achieve maximum reduction in the difference between the volume of capital spending and volume of fixed assets coming on-stream in the plan-covered period.

New, effective ways to achieve radical improvement in construction affairs in this country are outlined in the CPSU Central Committee and USSR Council of Ministers Decree of 12 July 1979 entitled "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Improving Production Efficiency and Work Quality." This decree is a most important document, which reflects consistent implementation of the party's economic strategy elaborated at the 23d, 24th and 25th congresses. It profoundly takes into account the specific features of this country's socioeconomic development under conditions of mature socialism and is grounded on the resolutions of the 25th CPSU Congress, decisions of CPSU Central Committee plenums, the provisions of the new USSR Constitution, and addresses by Comrade L. I. Brezhnev.

The decree contains a complex of important measures aimed at improving planning and management of this nation's economy. Among these measures, particular attention is focused on strengthening the role of the state plan. At the same time democratic elements and the rights of work forces are expanding, and economic incentive is being strengthened to promote

adoption of new equipment, labor productivity growth, improvement in product quality, increased effectiveness of capital spending and construction output.

Party and government assign responsibility for this big job to all administrative agencies as a whole and to each organization participating in the multiple-link construction chain. The key to accomplishment of the tasks formulated in this decree is first and foremost maximum coordination of common efforts. And it is essential to proceed with this job without delay. This particularly applies to us construction people, since the state of affairs in our sector is far from satisfactory, and we owe the country a great deal. We have many chronic and major deficiencies which cost the national economy dearly. But unquestionably we should devote priority attention to how better to ensure accomplishing the main task -- bringing production facilities and plants on-stream.

Here is how the work forces of USSR Minpromstroy [Ministry of Industrial Construction] are meeting facilities completion programs. In the first three and a half years of the 10th Five-Year Plan, out of 1,534 facilities and plants on the USSR Gosplan list scheduled for completion during this period, 1,145 have come on-stream, or 74.6% of the total number of facilities and plants. Of 340 facilities and plants plan-specified for 1979, 90 were to come on-stream in the first half of the year, while only 77 of these actually came on-stream, or 85% of the plan target. In spite of considerable organizational work to ensure concentration of resources on construction projects scheduled for completion in the same year, and in spite of a close watch on construction progress, every year Minpromstroy is left with dozens of facilities and plants which have failed to be completed. It is true that the level of completion has improved by 5% in the current five-year plan, but this is clearly insufficient, although a shift toward improvement has been noted. Things have improved primarily because the number of construction jobs in progress simultaneously has been reduced. Experience and know-how in concentrating resources on near-completion jobs has also unquestionably had an effect. Scientific and technical innovations adopted in USSR Minpromstroy are exerting an ever-increasing influence on speeding up the construction process.

The construction business is moving forward. It is more and more becoming transformed into a fully mechanized operation, and in many cases a continuous-flow process of assembly and erection of buildings and structures of elements with a maximum degree of prefabrication. Continuous-flow construction systems and methods, large-block unit erection, and erection of modular units with fully-installed service lines and process equipment are today being employed increasingly more frequently. All this has a substantial effect on ensuring accomplishment of the main task -- movement of production facilities and plants on-stream. For example, the conveyer-line method of assembly and erection of metal structures was employed in construction of the Lutsk Melange Yarn Combine, the country's biggest. The erection unit measures 18 x 12 meters, weighs more than 40 tons, and comes with fully-installed service lines. The rate of assembly and erection is

one or two units per day. More than 90% of the job has been shifted from high on the building to the ground; thousands of man-days have been saved. And recently a 700-ton petroleum hydrocracking reactor was installed in a single raise at the petrochemical enterprise under construction in Omsk, a world first.

In 1978 volume of construction of large-size components, assemblies, panels and units with fully-prefabricated load-bearing and enclosure structures reached 4.5 billion rubles of construction-erection work in the USSR Minpromstroy, comprising 71% of total work volume. A high level of fully-prefabricated construction was achieved in the Belorussian SSR Minpromstroy, Glavvostoksibstroy, Glavsrednevolzhskstroy, and Glavarkhangel'skstroy. It is not surprising that performance in bringing facilities on-stream has greatly improved in these subdivisions.

Industrial long-term continuous-flow construction systems (SIDPS) have become a reliable foundation for speeding up construction in USSR Minpromstroy. Client ministries, USSR Minmontazhpetsstroy [Ministry of Installation and Special Construction Work], Soyuzglavkompleks, scientific research and design institutes are participating jointly with USSR Minpromstroy in establishing these systems and securing their operation. As a result organization of construction is improving and it is becoming more industrialized -- construction is switching over to continuous flows formed by types of production output. In the current five-year plan 400 of the largest facilities and complexes are encompassed by an SIDPS system. It includes construction projects in chemicals, petrochemicals and petroleum refining, the food processing, meat packing and dairy products industry, grain elevator and silo construction, facilities in the Non-Chernozem Zone of the RSFSR, and construction of service lines. Light-industry facilities will be drawn into the system in the 11th Five-Year Plan, and a total of more than 600 large plants and facilities will be constructed on a long-term continuous flow. The nodal method of organization of construction has been employed on 250 construction jobs.

Another important aspect of the work of USSR Minpromstroy which influences movement of facilities on-stream is improvement in the structure of construction management. A search is under way to find new work forms and methods, specifically focused on increasing the efficiency of construction output. As a result of implemented measures, the territorial structure of construction management has been determined at the present time according to the principle of combining the interests of local agencies with the tasks of construction organizations at the oblast, kray and republic levels. These measures have made it possible to eliminate the excessive number of levels of management and to bring management closer to the construction site. Reduction in the cost of the management edifice was achieved primarily by eliminating small, unprofitable organizations and enterprises and consolidating the principal management units. As a result of consolidation, for example, the average work load on construction trusts in the ministry has now exceeded by volume that required for employee pay group I.

Centralization of planning-economic services, which has been fully implemented in 40 construction trusts of the ministry, produces considerable effect in work on improving the structure of management. Meriting mass dissemination is the experience of the Vinnitspromstroy Combine in planning and production-process batching for a consolidated construction brigade, which promotes concentration of resources on construction jobs to be completed in the current year. Further work is presently being done on improving management, which will be reflected in USSR Minpromstroy's general construction management model, which is currently being developed.

Development of an efficient method of economic management in construction, directly aimed at the end production result, a method which meets present demands and tasks specified in the 12 July 1979 CPSU Central Committee and USSR Council of Ministers decree, is currently taking place in the Belorussian SSR Minpromstroy. Its general formula is "ministry on economic accountability." And this signifies that it transitions to autonomous recovery of investment and autonomous financing. Profit from completed construction jobs becomes the sole source of funds. Commodity construction product is acknowledged as the principal planning and accounting indicator. Accounts between client and contractor are settled only for fully completed enterprises which have been brought on-stream, for completed complexes, units, and facilities. When allocating payroll funds the bank considers only work on finished product, and uncompleted construction -- in a volume not exceeding the standard figure. A transition is made to full construction credit up to the time a facility comes on-stream. The ministry's plan is set up as the sum of construction plans for all clients. As a result agreement is reached between client and contractor indices. The ministry has been authorized to distribute work volumes by years. This makes it possible to ensure the process sequence of production, to work more smoothly, and efficiently to utilize manpower and equipment.

Belorussian SSR Minpromstroy has operated for 3 years on the new system. During this time it has brought on-stream more than 2,700 large construction jobs, and 621 of these were completed ahead of schedule. The average annual growth rate of commodity construction output has exceeded 10%, and average duration of construction has been reduced by 16%. Volume of uncompleted construction has been brought down to the standard figure. The manpower and resources of construction organizations are being concentrated on current-year completion projects. In 1976 the percentage share of work performed on these jobs was 67.7% of the ministry's total program, while in 1978 the figure was up to 81.5%. The level of fully-prefabricated construction has reached 74.5%.

Obviously the Belorussian experience is a reliable foundation for extensive employment of this method in construction, which is replacing gross indices based on total volume of construction and erection work.

Construction must be performed with a smooth pace. And this rhythm should be scheduled. We must efficiently correct the placement of project completion deadlines in the final quarter of the year. What kind of smooth

rhythm or concentration of resources and manpower can there be, for example, when in 1978 45 out of 49 major construction projects of Belorussian SSR Minpromstroy were scheduled for completion in the final quarter?

Focusing on prompt completion of construction jobs should be determined at the preliminary planning and design stage. While preparing design and estimate documentation, the design people should determine the composition of complexes to be completed in the given year and, based on these, commodity construction output volumes, for each year USSR Minpromstroy lacks planning-estimate documentation at the beginning of the plan-covered year for almost one third of construction volume. It is precisely for this reason that a large number of facilities are not brought on-stream on schedule.

A lack of documentation delays preparation of project internal itemized lists. Clients are unable to submit to construction organizations on schedule documentation for finalizing contracts, and to banks for establishing financing. As of 1 June 1979, for example, financing for 1% of the annual construction volume had not yet been established for Belorussian SSR Minpromstroy, and contracts had not been signed for 4%. In the last 3 years clients have failed to submit to this ministry on schedule planning-estimate documentation representing more than 300 million rubles. This comprises approximately 11% of the scheduled work volume.

A 12 July 1979 CPSU Central Committee USSR Council of Ministers decree instructed USSR Gosplan, USSR ministries and agencies, and union republic councils of ministers to elaborate and carry out measures aimed at increasing the effectiveness of capital spending, acceleration of movement on-stream by production facilities and plants on prior-initiated construction projects, and sharp reduction in the number of newly-begun construction jobs in order within these next few years to bring the volume of uncompleted construction down to the specified standard figures.

This is a very important task, which specifies first and foremost improvement of the state of affairs at facilities under construction. To accomplish this task construction organizations must make every effort to concentrate resources and manpower on facilities scheduled for completion in the current year and eliminate scattering of capital spending among numerous new construction projects.

The decree specifies assignment to USSR ministries and agencies and union republic councils of ministers, beginning with the 11th Five-Year Plan, a stable five-year capital construction plan (with targets broken down by years), balanced with resources in materials, process and power equipment, labor and financial resources, as well as with the output capacities of construction organizations. Issuing to ministries manufacturing basic process and power equipment of orders for delivery of this equipment will be performed for the entire period of construction.

USSR Gosplan has been instructed to submit to the USSR Council of Ministers, at the same time as draft five-year capital construction plans for the USSR ministries and agencies and union republic councils of ministers, contract work schedules, with their distribution among contractor ministries and agencies, union republics, client ministries and agencies, designating areas of concentrated construction.

One can scarcely exaggerate the importance of this decision, since construction ministries and agencies and their subordinate construction organizations did not have contract work five-year plans. A stable five-year capital construction plan broken down by years, balanced with resources and capabilities of construction organizations, ensures continuity of planning and consequently improved preparation for and execution of construction, particularly on jobs scheduled for completion in the current year.

Implementation of the demands formulated in the decree and communication of plan targets simultaneously to clients, general contractors and subcontractor organizations radically alters their mutual relations. Plans will become uniform and integral, based on a unity of common objectives. New, more advanced criteria and incentives should now go into effect. Transition to them will constitute a landmark of improvement in the mechanism of economic management in capital construction and an effective means of achieving a further boost in construction output, improvement in the quality of construction work, and reduction in duration of construction.

Pursuant to the decree, beginning with the 11th Five-Year Plan a target for movement of facilities and plants on-stream will also be established for subcontractor organizations, in contrast to the previously-existing practice.

Evaluation of the economic activities of construction organizations as well as economic incentive for these organizations is to be based on the results of accomplishment of targets pertaining to bringing production facilities and plants on-stream, construction commodity output, and labor productivity and profit growth.

Thus construction participants are pledged to achieve the end result -- bringing a facility on-stream -- not at any cost but with expenditures within the limits of estimated cost of construction commodity output, ensuring thereby a high organizational-technical level of construction output, the specified labor productivity growth in construction, and adherence to a strict regimen of economy in material and labor resources which ensures earning a profit.

The content of the concept of bringing on-stream production facilities and plants ready to turn out product or perform services is changing. Today it signifies that at enterprises, near-completion complexes, units and facilities ready to come on-stream, not only construction and installation

work should be fully completed and installed equipment comprehensively tested under no-load conditions, but also startup and adjustment operations should be performed, performance of which is the obligation of the client and the cost of which is not included in the estimated cost of construction and installation work assigned to contractor organizations. Thus preparation of production facilities and installations for coming on-stream should also be performed by the client, and in the area of startup and adjustment procedures, by the startup deadline specified in the plan, as well as performance of all preparatory procedures for normal operation of production facilities and plants coming on-stream (securement of personnel, acquisition of in-plant transport equipment, minor equipment, tools, process raw materials, etc).

It is very important that the 12 July 1979 CPSU Central Committee and USSR Council of Ministers decree, in order to increase the responsibility of clients and contractors for prompt movement on-stream of production facilities and plants, specifies including in capital construction plans, beginning in 1981, only those construction jobs for which as of 1 July of the year preceding the plan-covered year there exist properly ratified design-estimate documentation as well as working drawings for the year's construction volume.

A supplement to the Contract Regulations should be added in conformity with the focus on the new principles of economic management. They should state that a contract should extend to cover the entire time of construction and that the subject of the contract is construction commodity output, specifying as equal the legal liability of contractors and clients for meeting contractual obligations.

Focusing the participants in the construction process on concentration of resources in the main area of work -- bringing facilities on-stream, the party and government are reinforcing the organizational foundation of material incentive to improve the performance of workers in this sector. The decree specifies increasing bonuses for on-schedule movement on-stream of production facilities and plants on the average to 3% of the estimated cost of performed construction and installation work on facilities and plants brought on-stream.

One of the main reasons for failure to meet project completion targets in construction is delay in completing engineer preparation for construction output. The officials of many construction organizations seek to begin basic construction before all preparatory work is completed, which always leads subsequently to considerable complications. Thorough elaboration and priority performance of the entire complex of engineer preparation tasks prior to initiating construction should be mandatory in construction output.

Work plans with network schedules should be prepared not for 30-40% of facilities under construction as is presently the case but for all facilities to be completed in the plan-covered year, and should become

leading documents on the construction process and application of advanced work methods.

The brigade form of organization of labor and labor incentive, in conformity with the 12 July 1979 CPSU Central Committee and USSR Council of Ministers decree, should become in the 11th Five-Year Plan the principal form of performance of construction work. The potential of its extensive utilization is confirmed by figures on the Belorussian SSR Minpromstroy, where in 1978 71% of the ministry's total work volume was performed by the brigade contract method.

At a meeting with voters of Moscow's Baumanskiy Electoral District, Comrade L. I. Brezhnev stated that today new approaches are needed in capital spending policy and in many areas of technical policy, as well as maneuver of available equipment and labor resources, plus overcoming narrow, parochial and localistic tendencies. This also requires a certain reorganization in planning and methods of economic management and in the system of indices and material incentive. No matter how complex this reorganization may be, it is essential. This complex but very necessary reorganization is also mandated by the 12 July 1979 CPSU Central Committee and USSR Council of Ministers Decree entitled "On Improving Planning and Strengthening the Effect of the Economic Mechanism on Improving Production Efficiency and Work Quality." Implementation of the measures specified by this decree is the best guarantee of ensuring accomplishment of the main task of construction -- bringing production facilities and plants on-stream.

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### NINE-MONTH RESULTS OF GLAVNECHERNOZEMVODSTROY ORGANIZATIONS

Moscow STROITEL'NAYA GAZETA in Russian 21 Oct 79 p 2

[Article: "Nearing the Finish"]

[Text] The following table shows the performance of the subdivisions of the contractor ministries on construction of Glevnechernozemvodstroy construction industry complexes for the first nine months of the year.

| Contractor Ministries  | Lag From<br>Beginning<br>of Con-<br>struction<br>(million<br>rubles) | Plan Fulfillment (%) |      |
|--|--|----------------------|------|
|  |  | Nine<br>Months       | 1979 |
| USSR Ministry of Land Reclama-<br>tion and Water Resources     | 12.45  | 68                   | 54   |
| USSR Ministry of Construction                                  | 11.89  | 53                   | 40   |
| USSR Ministry of Construction<br>of Heavy Industry Enterprises | 8.86   | 65                   | 49   |
| USSR Ministry of Industrial<br>Construction                    | 4.20   | 92                   | 65   |

In a review prepared with the assistance of Glavnechernozemvodstroy, STROITEL'NAYA GAZETA (No 84, 15 July 1979) acquainted its readers with the performance of contractor ministries for the first half of the year. In particular, it named those near-completion jobs on which competition between contractors was in full swing and where contracts were concluded following the "Work Relay" principle. Unfortunately the geography of labor comradeship has not greatly expanded. A contract was signed only at the Balakhna base in Gor'kovskaya Oblast.

The lead in subcontractor competition has long been held firmly by the work force of Trust No 11 of the Ryazan'stroy Association (I. Pletnev, manager). A few days ago a state commission set up shop here: construction has been completed on a 300-truck motor transport enterprise.

Installation of process equipment is proceeding at full speed on facilities of the first unit at a reinforced concrete products plant. The labor alliance partners pledged to bring these facilities on-stream at the end of November. The subdivisions of USSR Minenergo [Ministry of Power and Electrification] and Minmontazhpetsstroy [Ministry of Installation and Special Construction Work] are working in smooth rhythm with the general contractor on this final stretch. Oblast headquarters is focusing associated subcontractors on efforts to ensure that principal operations are completed before the onset of winter.

We must note that the general contractor organizations of USSR Minpromstroy [Ministry of Industrial Construction], working in close contact with near-completion project headquarters in Ryazanskaya, Kaluzhskaya, and Bryanskaya oblasts, have achieved an increase in volume of construction and installation work by more than 2 million rubles in comparison with the corresponding period last year. A high degree of organization in all components of the construction flow has been achieved at the Kondrovo base. They are erecting the buildings of a motor transport enterprise and an UPTK [Production-Technological Supply Administration] base. Oblast headquarters (N. Almazov, chief) is taking measures to supply the construction site with heat.

The Kondrovo base is no exception. Project-completion complexes have been organized at all land development bases being constructed by USSR Minpromstroy. The people in the ministry's Non-Chernozem Zone division continuously monitor the state of affairs at the construction sites and are rendering practical assistance in resolving urgent problems which arise in the course of construction. The ministry's party committee receives reports from construction job supervisors on meeting adopted pledges and on creation of conditions for expanding competition on the "work relay" principle.

Subdivisions of USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises] have achieved an increase in work volume in comparison with last year. But the 9-month target was not achieved. It has been 2 years, for example, since the production building of the reinforced concrete products plant at the Vologda base was erected, while installation of equipment is still being delayed. Work to the detriment of near-completion projects is being performed along the entire construction front, in a scattered manner. Oblast headquarters has been unable to concentrate resources. And yet there is a realistic possibility of putting on-stream the first unit of the reinforced concrete products plant this year.

Similar measures are also needed at the base in the Komi ASSR. The fact is that one year ago the Komityazhstroy Association did a considerable amount of shoddy work on erection of the production building. The problem has now been corrected, but the general contractor, in order to achieve a better performance in gross construction output, has shifted construction workers to early-stage construction jobs.

Patron subdivisions of USSR Minvodkhoz [Ministry of Land Reclamation and Water Resources] which are building bases in Ivanovskaya and Kalininskaya oblasts have in the last 3 months reduced by almost 1 million rubles the gap between performance and target. The pace of construction, however, is insufficient to put near-completion facilities on-stream. For example, Glavsredazirsovkhozstroy (N. Khamrayev, chief) was planning to complete last year work on the first unit of a reinforced concrete products plant. But even now there is considerable apprehension over completion of this facility. USSR Minvodkhoz should reexamine progress in meeting pledges.

Less than one fifth of allocated funds have been expended by the USSR Ministry of Construction on the near-completion complex in Pskovskaya Oblast. Approximately 500,000 rubles worth of construction and erection work is being performed at four bases -- in Kaliningradskaya, Kirovskaya, Smolenskaya, and Kostromskaya oblasts. If they continue building at this pace, the organizations of the USSR Ministry of Construction will take at least 15 years to complete the construction industry complexes of Glavnechernozemvodstroy. It is not surprising that the degree of completion of priority facilities is miserably low at the present time at all bases under construction except for Balakhna.

The state of affairs is totally unsatisfactory in Smolenskaya and Kirovskaya oblasts, where completion of facilities is being postponed from year to year. Obviously USSR Gosplan, in drawing up long-range development plans for bases in the Non-Chernozem Zone, should study in greater detail the realistic capabilities of general contractor organizations. Allocating equipment worth many millions of rubles -- in the assumption that plan targets will be met -- planning agencies are unwittingly generating huge stocks of materials and above-standard supplies on hand.

The end of the year is drawing nigh, as is startup of priority facilities at land improvement bases. This year's target calls for bringing on-stream enterprises with a production capacity of 330,000 cubic meters of precast reinforced concrete and 10,000 tons of metal structures. It is now quite clear that startup of the reinforced concrete products plants in Yaroslavl', Ivanovo and Pskov is threatened. The "promissory notes" given at the beginning of the year and formally stated in the "Work Relay" contracts have defaulted.

Can the situation be somehow corrected in this manner? Without question. Oblast land improvement associations must send specialists to the plants and take all measures to keep them there. It is important to speed up construction of housing developments designated for land improvement personnel. The editors have received reports that proper working conditions for operating personnel have not yet been established everywhere.

It is the duty of party, Soviet and trade union organizations, oblast facilities startup headquarters and officials from the subdivisions of USSR Minstroy, Minvodkhoz, Mintyazhstroy, Minpromstroy, and Minenergo to take effective measures to achieve definite startup of completion-targeted facilities in the Non-Chernozem Zone.

## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### SCHOOL FACILITIES CONSTRUCTION DELAYS NOTED

Moscow STROITEL'NAYA GAZETA in Russian 23 Nov 79 p 2

[Article by "Observer": "Carry Out One's Duty to the Kiddies"]

[Text] The state plans of economic and social development of this country contain only one section in which there is a line drawn through the fourth-quarter column, indicating no facilities targeted for completion this quarter. The facilities in question are school buildings. The construction people were to complete them not later than the beginning of the school year.

The majority of new school buildings opened their doors as scheduled by the first day of school, facilities accommodating more than 1 million schoolchildren. Just as last year, the construction people in Moscow and Leningrad completed all schools on schedule. Almost all new school facilities met completion deadlines in Lithuania, Georgia, and in the Ukraine.

But far from all pledges to schoolchildren were kept. As a result approximately 300,000 pupils were unable to start the year in new buildings: approximately one out of every four new schools is not yet ready for use. State capital allocations for the first three quarters of the year were 87% utilized. The USSR Ministry of Construction of Heavy Industry Enterprises accomplished its annual school completion program by 83%, the USSR Ministry of Construction -- by 82%, the USSR Ministry of Industrial Construction -- by 77%, and the USSR ministry of Rural Construction -- by 61%.

The situation is particularly bad in Tadzhikistan and Kirgizia: approximately half of the new schools are not yet in operation. The situation is not much better in Kazakhstan, Estonia, Moldavia, and Turkmenia. The school construction target for the first 9 months of the year was met by 56, 63, 64, and 65% respectively. And few facilities were completed in October.

Construction of rural schools is even further behind schedule. For the country as a whole, the annual school facilities completion program has been only 59% achieved. In the first three quarters of the year 81% of state capital allocations were utilized. Work is proceeding particularly slowly in Tadzhikistan and Azerbaydzhhan, where at the present time classes

are being held in only one out of every four schools scheduled for completion. In Kazakhstan 64,000 children were scheduled to begin the year in new schools, while only one third this number were able actually to enroll in newly-completed facilities. The lagging areas once again include the Moldavian SSR and the Kirgiz SSR. And yet in Georgia, Lithuania, and the Ukraine construction is proceeding on schedule not only in urban but also rural areas. In Georgia they even overfulfilled the year's target for completing these facilities.

In rural areas kolkhozes endeavor to render considerable assistance in building schools. This year alone new school buildings accommodating 182,000 children were scheduled to be built with kolkhoz funds, but up to the present time slightly more than half of this total has been completed.

Also cause for concern is the state of affairs pertaining to completion of the construction program for children's preschool facilities. Even in those republics where things were moving well in the first half of the year, the 10-month target has not been met. And of course they are particularly behind wherever construction was slow from the beginning of the year. The Azerbaydzhani and Turkmen republics have set unique "records" in this regard: they have completed only slightly more than one tenth of completion-scheduled facilities.

Construction of preschool facilities with funds received from Communist unpaid mass work days merits particular attention. But unfortunately the funds earned by workers were only 61 percent spent during the period under review, and only 47% of scheduled facilities were completed.

What kind of a job is being done by the four principal contractor ministries? Yu. Novozhilov, chief of the Capital Construction Administration of the USSR Ministry of Education, offered a concise reply to this question: not one of these construction ministries has met the plan-specified target for construction of children's facilities. The plan has not been fulfilled, either for facilities completion or construction volume.

Contractor organizations of the USSR Ministry of Construction of Heavy Industry Enterprises, Ministry of Construction and Ministry of Industrial Construction have completed during this period approximately one third of facilities for children awaiting new facilities this year, while the Ministry of Rural Construction has completed only one half of its completion-targeted facilities. School-adjacent boarding facilities and housing for rural teachers are also far behind schedule.

We assign a priority status to facilities designated for children. These construction projects are acquiring particular importance in the International Year of the Child.

In the time remaining before the end of the year construction workers should carry out their duty to our children and complete all facilities scheduled for completion this year.

## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### 'DRUZHBA' GENERAL PURPOSE SPORTS HALL DESCRIBED

Moscow STROITEL'STVO I ARKHITEKTURA MOSKVY in Russian No 9, Sep 79 pp 24-27

[Article by N. Schmidt, candidate of architecture: "The 'Druzhba' General Purpose Sports Hall"]

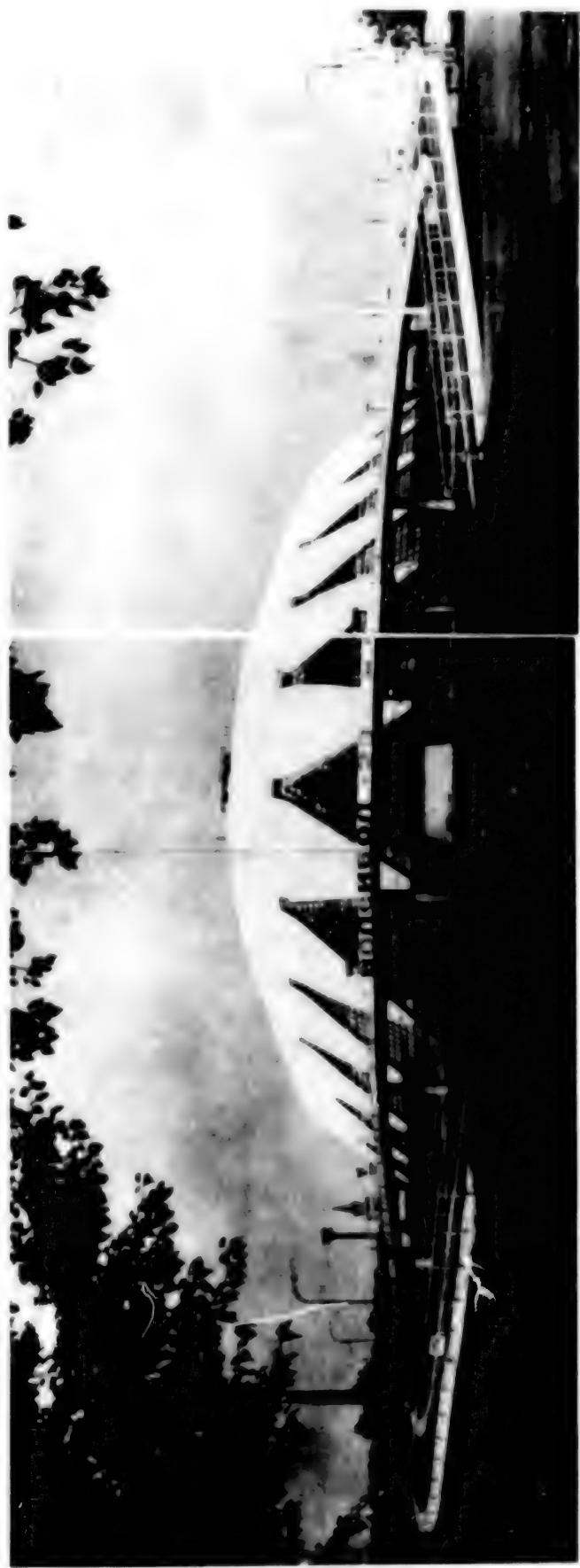
[Text] The general purpose sports hall in Luzhniki occupies a prominent position among the sports structures that are being built for the 1980 Olympiad.\* Its construction is for the most part complete. The first testing took place during the 7th USSR National Spartakiade.

The hall, like the Malaya Sports arena, is intended for the Olympic volleyball tournament. In the future contests and training for a number of different sports may be conducted here--basketball, badminton, volleyball, table tennis, handball and tennis as well as boxing, wrestling, fencing, gymnastic and acrobatic contests.

The convertible stands in the main central hall seat up to 4,000 spectators, depending on the dimensions of the area needed for this or that type of sport. The largest dimension of the arena is 42 x 42 m (two tennis courts); the smallest is about 32 x 32 m. The number of fixed seats in the stands is 1,500; increasing the seating capacity is accomplished by means of the movable folding sections in the lower tier of the stands.

In addition to the main hall there are also four training halls having dimensions of 26 x 18 m. The composition of auxiliary, service and utility rooms completely provides for the sports participants and spectators. We would add that the structure is also designed to provide services for those who use the tennis courts, and in the winter the visitors who use the skating rink which is erected on the courts.

\*Authors' Collective--Technical design: architects--Yu. Bol'shakov, I. Rozhin, V. Tarasevich, V. Maksimenko; engineers--Yu. Rozovskiy, L. Kharitonov ("Mosproekt-2" [Moscow Design Studio-2]); G. L'vov, E. Zhukovskiy, B. Mukhin (MNIITEP-[Moscow Scientific Research Institute of Technical-Economic Indicators]) Working design: architects--Yu. Bol'shakov, V. Tarasevich, V. Pontryagin, D. Sokolov; engineers--Yu. Rozovskiy, L. Kharitonov, T. Rud' ("Mosproekt-2"); G. L'vov, E. Zhukovskiy, V. Shabaya (MNIITEP).



Overall view of the "Druzhba" general purpose hall

The cloakroom for the spectators located in the foyer was uniquely and innovatively designed to be convertible. During the times when there are no contests the foyer is used for conducting tennis practice against a wall (one of the necessary elements of the training cycle) which is anchored by mechanical means along the perimeter of the cloakroom, partitioning it off from the foyer and which may be then folded up above. This is the first time in construction practice that such a conversion was accomplished. The dimensions of the foyer provide for the formation of four areas in front of the walls of the needed size (24 x 11 m).

N Pekareva's\* article relates the construction and planning of this unique hall more in detail as well as its urban construction importance. One can say with certainty that the testimonial given in this article is in complete conformity with this already constructed Olympic structure.

It is impossible, for example, not to agree with the fact that the place selected for construction, which is on the territory of the stadium imeni V. I. Lenin, is not only suitable but perhaps the only proper one. It would now be easy to imagine what the hall would look like if (as several people proposed during approval of the project) the building were close to Metromost. It could not have been seen either from the Frunzen bank or from the opposite river bank and basically only the roof would have been visible from Metromost. The structure would have lost the predominant significance which it has acquired at the present time in the layout and spatial composition of this part of Luzhniki.

Despite the sufficiently complex and diverse technical connections between the various areas and their groups, the engineering peculiarities and the framework conditions, the authors of the project were able to achieve organic unity in solving the functional, structural and aesthetic problems which faced them.

I would like to focus on several features which characterize the structure's architecture.

When looking at the drawings, the plan, which is as compact as it can possibly be, is perceived to be a square that is drawn up tightly along the perimeter which makes its sides and especially its angles appear to be compressed and softened. The characteristics of this design approach, which magnify its centricity, are also reflected in the form of the structure's shape.

In addition to this the entire building gives the impression of lightness. This was accomplished by the configuration of "finger" buttresses, which are tapered, forcefully extended downwards, and which rest flexibly on the surrounding surface (to be more exact, on the "sockets" which come out of it.)

\*See N. Pekareva—General Purpose Sports Hall in Luzhniki in STROITEL'STVO I KONSTRUKCIЯ MOSKVI, 1976, No 3, pp 14-17.

The triangular transverse section of the buttress as well as the stained glass windows create the original plastic arts of the interior surface of the space.

Despite the fixed horizontal dimensions of the building--the longest diagonal dimension (along the entrance to the hall) is 98 m, the shortest (along the stands) is 90 m--its height is only about 24-25m above ground level. In this way the building is not out of spatial scale in relation to the surrounding environment. And this is also one of the authors' successes.

Several words about the interior, first of all about the main hall. The unique form of the building's layout may be easily guessed by the hall's structure. This was achieved as much by the form and elements of the ceiling's surface, the location of the stands and other components of the interior as by the unification of the hall's space with the adjoining foyer.

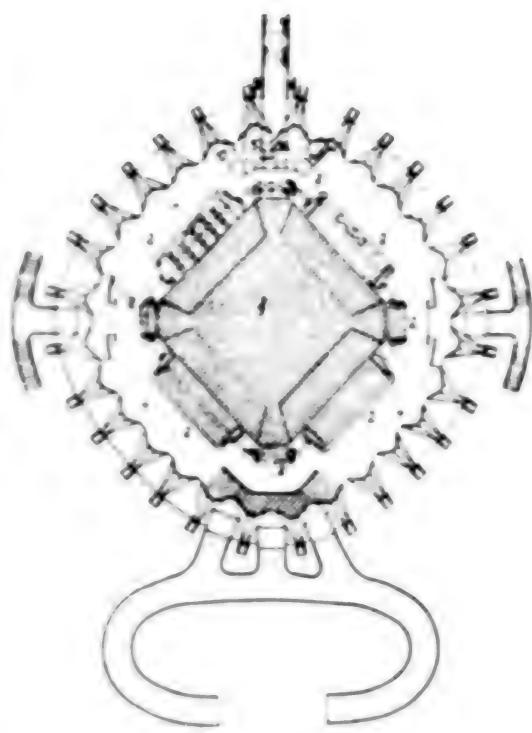
This unity contributes to the well-selected color scheme, the basic accent being the soft red color of the spectators' seats. The interiors of the foyers surrounding the hall, which comprise a unified "overflowing" space, as well as the interiors of the remaining major and auxiliary areas are, in the manner of athletics, simple and laconic in their surroundings and material decorations. They are a background for the main hall.

To the authors' and builders' credit--it may be noted that during the stage for completing the working drawings and the construction phase essential changes in the technical design were able to be avoided. Only the configuration of the exterior ramps and stairways which connect the approaches to the building on the level where the rooms are located was significantly changed. These revisions should be recognized as being successful since they led to shortening of the ramps' length and more precisely oriented them in the direction of the spectators' main entrance and of the other entrances.

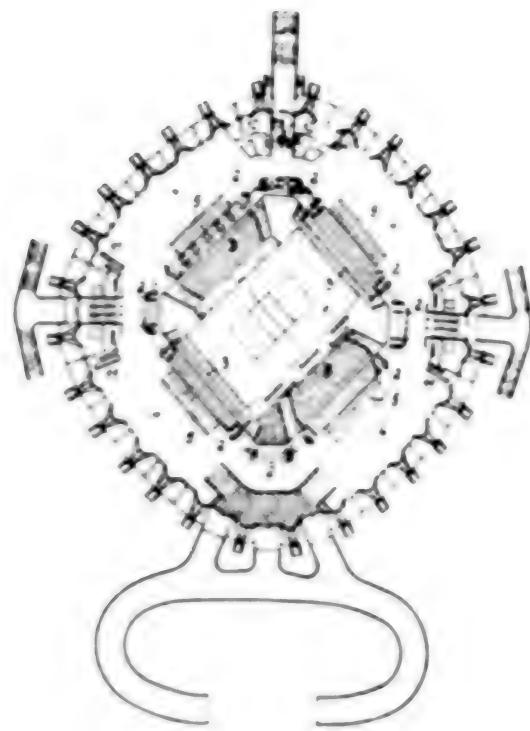
It must, truthfully, be acknowledged that the presence of the ramps and stairways somewhat disturbs the cleanliness and wholeness of the lower portion of the structure's perceived shape. However, with such a compact and centric design this proved to be unavoidable and the authors were able to give it, by means of plastic surroundings, a form and size which would not elicit protests from the spectators. Inserted into the composition, they are almost unnoticeable from afar and are perceived along with the building's surrounding landscape and facilities.

In giving the authors' collective its due for the creation of this unique work for the 1980 Olympiad it would be one-sided and a mistake to silently pass over, what are in our view, several imperfections and deficiencies, both in the architectural design and those that occurred during the construction phase.

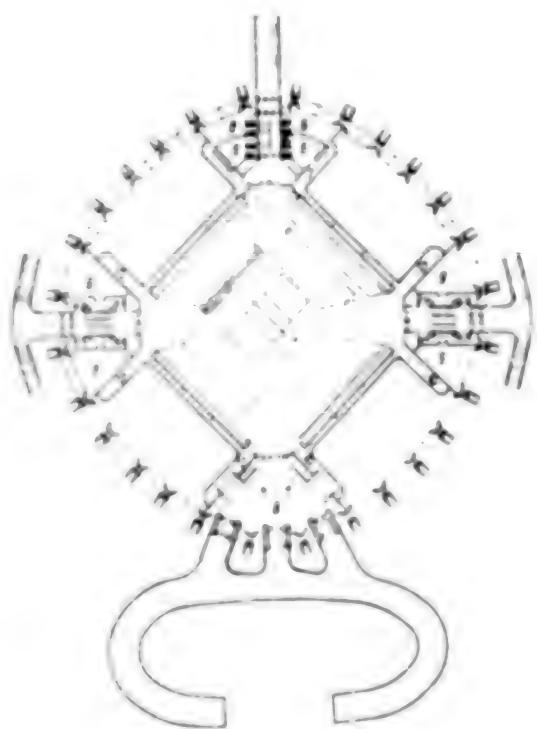
First of all we will mention that the possibility of adding contours to the surface of the structure was not taken advantage of which would give it each greater depth and plasticity by separating the glazed areas of the halls from



Plan of upper stands

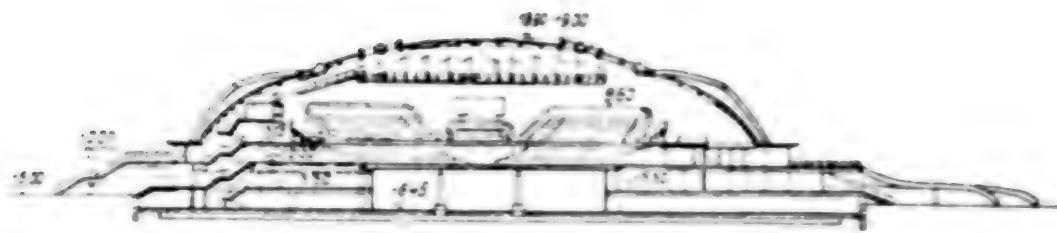


Second floor plan

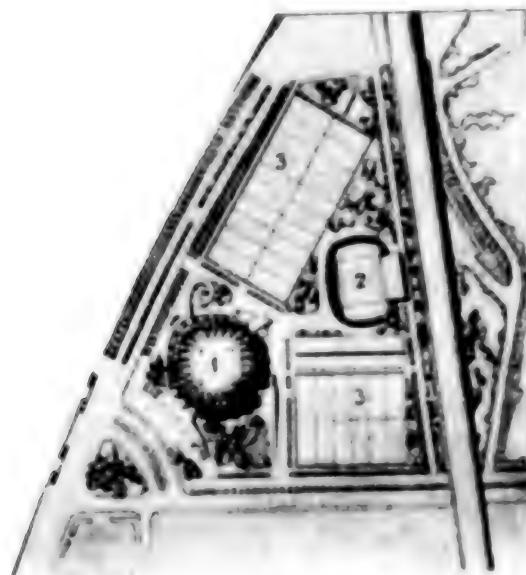


First floor plan

1. Arena;
2. Stationery stands;
3. Convertible (movable stands);
4. foyer;
5. cloakroom (convertible) for spectators;
6. locker rooms;
7. hall, cloakroom for sportsmen;
8. lobby;
9. restrooms for spectators;
10. service areas;
11. snack bars.



Cross-section of the main hall along the entrance

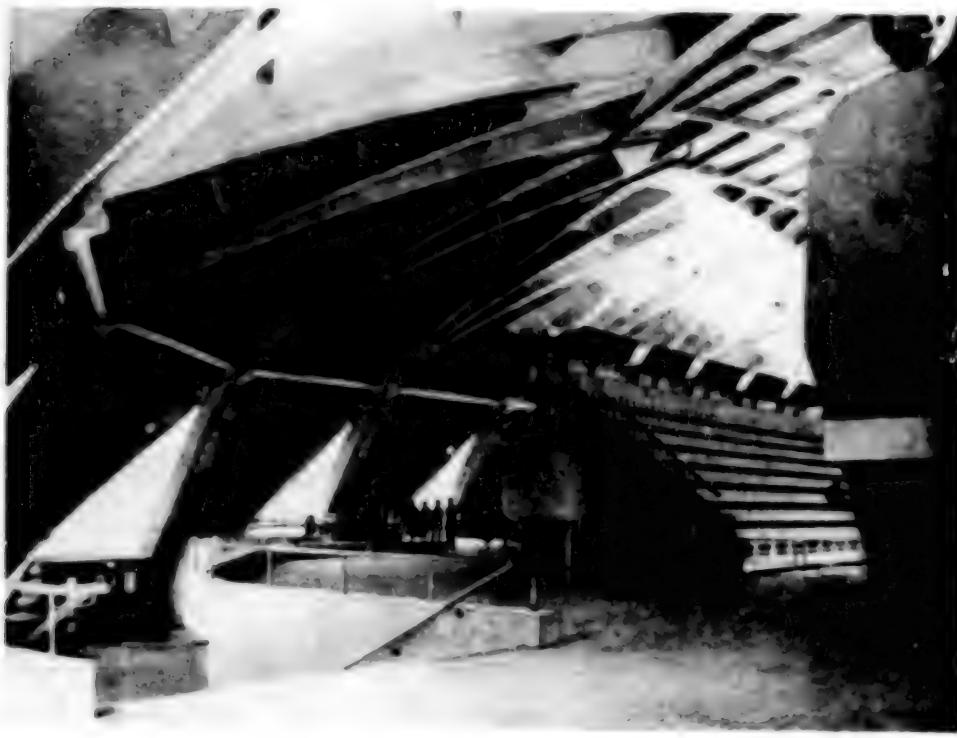


General plan (technical design):

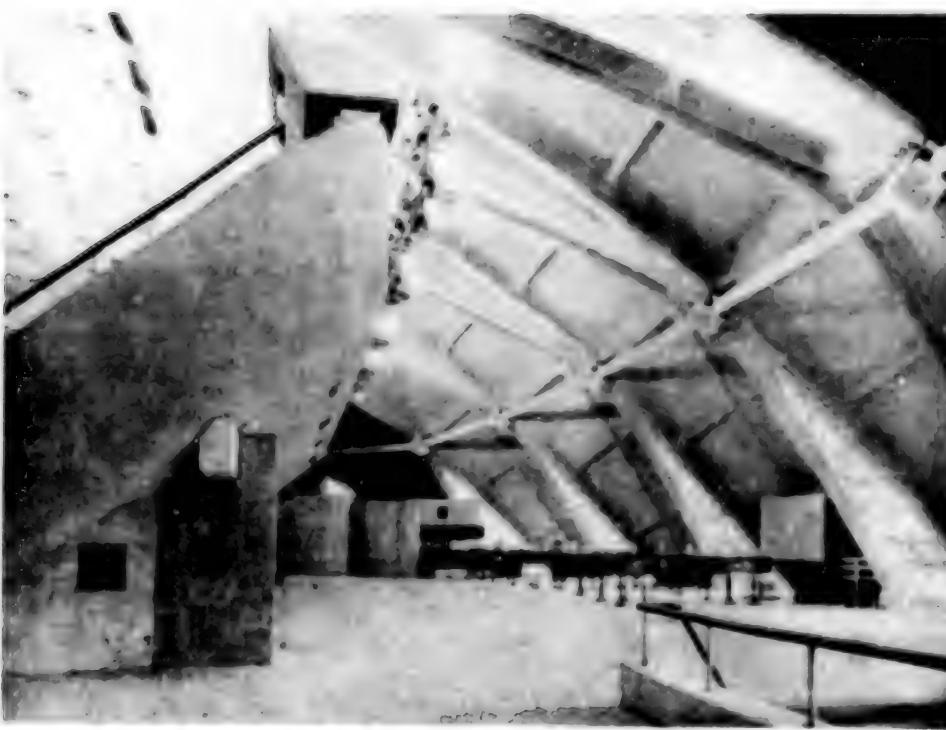
1. "Druzhba" general purpose hall;
2. Open air demonstration arena;
3. Open air tennis courts (in winter, a skating rink)

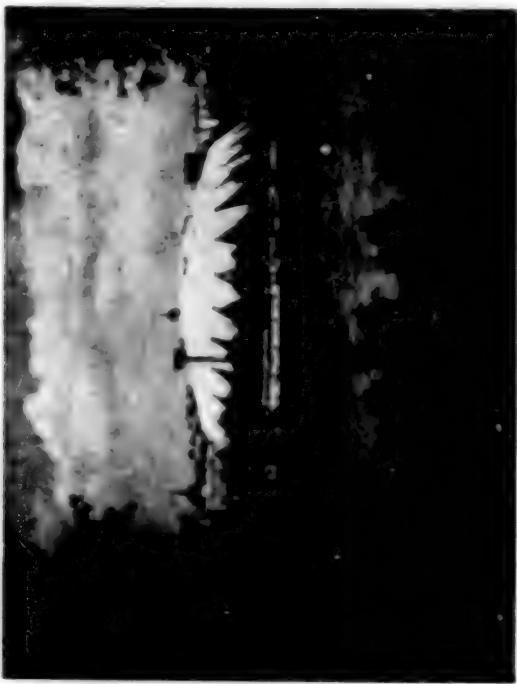


Interior of the main hall



Interior  
of one  
of the  
training  
halls





View of "Druzhba" hall from the park imeni M. Gor'kogo

the ribs of the buttress structures. By increasing the shadows the open space which was formed behind the ribs would have heightened the plastic art, emphasized its structural formation and would have made the structure even that much lighter.

The points of the bearing ribs rest on the sockets which extend from the surface surrounding the building. They are faced with polished black granite in the same manner as the foundation in the gaps between the buttresses. If the color and texture of the facing for that portion of the foundation below the stained glass windows were to continue the color and texture pattern of the stained glass windows and form a unified whole with it, then the black shining surfaces of the sockets would be isolated from the light and dull border of the buttress ribs. Then the entire structure would seem as if it were suspended over the earth.... In our view it is necessary to coordinate the facings of the "sockets" with the color and features of the buttress ribs' borders.

Speaking in utilization-technological terms the fact of the matter is that the exit onto the ice in the winter for a thousand visitors to the skating rink is by means of a stairway. In making preparations for the winter season it would have been more efficient to build inclined wooden slopes (ramps) covered with rubber. The ramps must be provided with handrails.

The fact that the builders did not use an acoustical ceiling in the training halls is puzzling, which results in loud echoes in the halls. Considering the piercing sounds that result from striking a ball in a game such as tennis or volleyball as well as when dribbling a basketball it is necessary, in the time remaining before the Olympiad, to provide the needed acoustical conditions in the halls. It is not difficult to do this, especially since the ceilings in these halls are specified, as we understand, by the design and the estimate.

On the whole the quality of the construction and finish work is on a fine level. Just the same, keeping in mind that sufficient time remains before the start of the Olympic Games in Moscow, the remaining months should be used to correct certain defects and bring the structure up to its completed state, so to speak.

...the ringing cries of our fans "Well done" have already resounded under the hall's arches. They were directed at the sportsmen who participated in the Spartakiade's affiliated games. But they may be directed also, with complete justification, to the entire collective of architects, engineers and builders, to all of those who put their inspiration and labor into the creation of this remarkable Olympic structure.

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### SPECIAL FEATURES OF OLYMPIC ARCHITECTURE DESCRIBED

Moscow VOZDUSHNIY TRANSPORT in Russian 30 Oct 79 p 4

[Interview of professor Vladimir Belousov, Secretary of the USSR Architect's Union by APN [Norosti Press Agency] correspondent V. Melik-Karamov: "A Silhouette of the Planet's Sporting Forum"]

[Text] [Question] Perhaps each Olympiad has had its architectural symbol: the gynmasium in Tokyo, the acrylic roof over the Olympic stadium in Munich, the Olympic village in Montreal... What could be called the architectural symbol of the Moscow games in your viewpoint?

[Answer] Unquestionably the enclosed stadium on Mir Boulevard which seats 45,000 spectators. It is unique for its architecture as well as for its structural features. Until now there were only two enclosed stadiums with a large seating capacity--both in the southern U.S.A. But the Moscow stadium is distinguished essentially by the fact that its huge playing field may be divided into two parts by a rigid soundproof screen and by its membrane roof which is capable of supporting the load of 1,000 tons of snow in winter.

I would also like to single out the velotrack in Krylat for its structurally original floor--a hyperbolic paraboloid.

The Olympic village in Montreal was certainly a bold and interesting design in its exterior architectural approach. The author of the Olympic village project in Moscow, Evgeny Stamo, noticed this after having been in Canada. Yet he, as well as many of the village's residents and visitors for the 21st Games, by the way, spoke of the inconveniences in the interior planning. I will note that in our very first sketches the future housing units in the "village" were governed more by form than by content. For example, one of the proposals appeared like this: the entire housing portion of the village is to be constructed in the form of five interlaced multi-colored rings. But in the end we took into consideration the fact that the Games continue for two weeks but the 14,000 Moscovites who will obtain apartments in this new microrayon after the Olympiad will live here for many years.

[Question] Like the director of the Central Scientific Research Design Institute you probably must take part either in the planning or the discussions for the sports construction in our country. What are their notable features?

[Answer] The most important one is that without sports construction no housing construction is possible. The basic client of the architects--the urban soviet of people's deputies--will not accept a project for a housing rayon in which a sports center is not provided. Finally, there are construction standards and regulations which specify the proportional relationship between the number of inhabitants of a city and the number of large sports structures.

[Question] But let's return to the Moscow Olympiad. In what manner are the architectural concepts for the 1980 Olympiad distinguished from previous Olympiads?

[Answer] It seems to me that previously architects for the Games approached the Olympiad as they would a large-scale international fair. As is well known a fair is temporary and the short duration of it dictated the architectural form which was especially embodied, in my opinion, in Munich.

Recommendations for an urban construction plan of Moscow, in other words, an architectural concept for the future growth of the city included, among other things, the creation of sport centers in eight housing zones of the capital, each with a population of a million people, long before it was selected as the Olympic capital.

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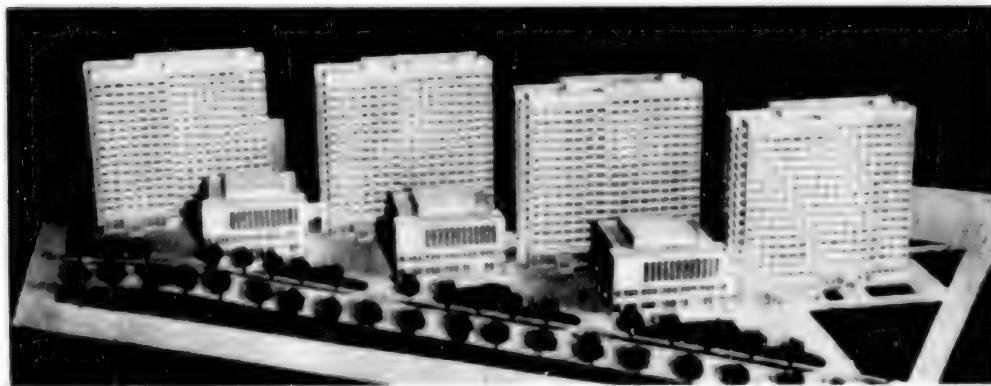
## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### NEW HOTEL FOR OLYMPICS DESCRIBED

Moscow NA STROYKAKH ROSSII in Russian No 9, Sep 79 pp 52-55

[Article by V. Khavin, chief architect for the project, and I. Elizarova, architect: "Moscow Prepares for the 1980 Olympiad"]

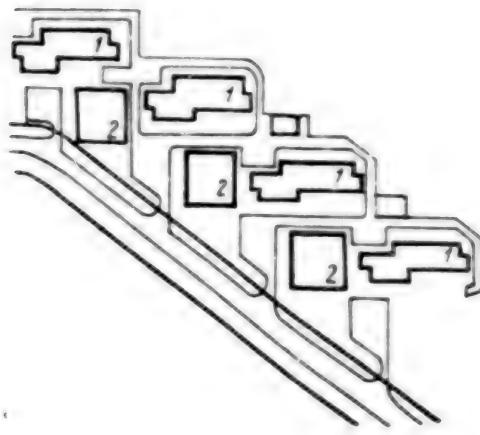
[Text] Along Bol'shaya Yushun' Street near the Kakhov subway station one of the largest hotel complexes in the capital is being erected--the Sevestopol', a tourist class hotel for visiting foreign tourists. Its structure was successfully combined with the new Volkhonok-ZIL architectural ensemble which it will adorn.



Overall view of the Sevestopol' hotel for foreign tourists.

A comparatively small portion of the structure as well as the adjoining five-story housing units determined the building's principal urban construction role. By its composition it contrasts with the surroundings and creates an expressive silhouette when viewed from the rayon's center--Sevestopol' Square.

The complex consists of four separately standing 16-story housing units which will house 3,600 people simultaneously and three 4-story restaurants, calculated to hold 590 visitors each, which connect them.



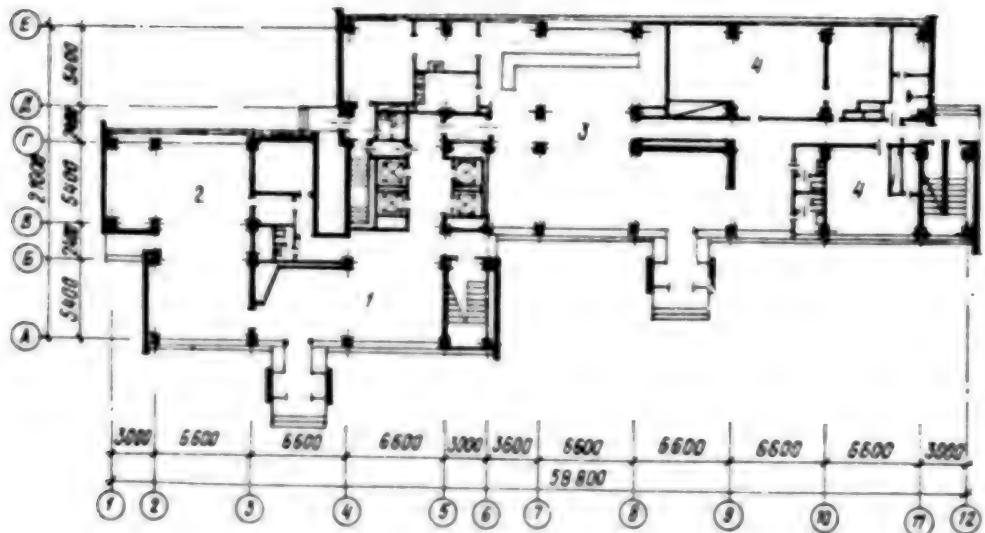
General plan of the hotel complex layout:

KEY: (1) hotel buildings  
(2) restaurants

Sixteen-story framework panels for hotel-type housing units were used for the sleeping quarters. During reworking of the design based on composite existing structures the majority of changes that were made were necessary for normal hotel use in accordance with existing standards.

Instead of the kitchen, which was previously provided on each floor, a snack bar with a seating capacity of 20-25 people was designed for every other floor. For the remaining floors the kitchen area was used for service or official functions. Recreation halls were added on each floor in which televisions will be installed.

There are places for receiving groups, a service bureau with a currency exchange station, kiosks which sell souvenirs and a "Soyuzpechat" in the lobbies. On the first floor of the buildings are a barber and beautician, a communications department, quick-serve refreshment bars that seat 150-200 people, and an office for everyday repairs and services.



First floor plan of the hotel building:

- KEY:
- (1) lobby
  - (2) tourist reception bureau
  - (3) quick-serve refreshment bar
  - (4) rooms for domestic services



Typical floor plan:

- KEY:
- (1) guest rooms
  - (2) guard room
  - (3) hall
  - (4) room for ironing clothes

On the second floor are rooms for social organizations, guides, the management, accounting, staff quarters which have toilet facilities and showers, building maintenance rooms, and an insulator.

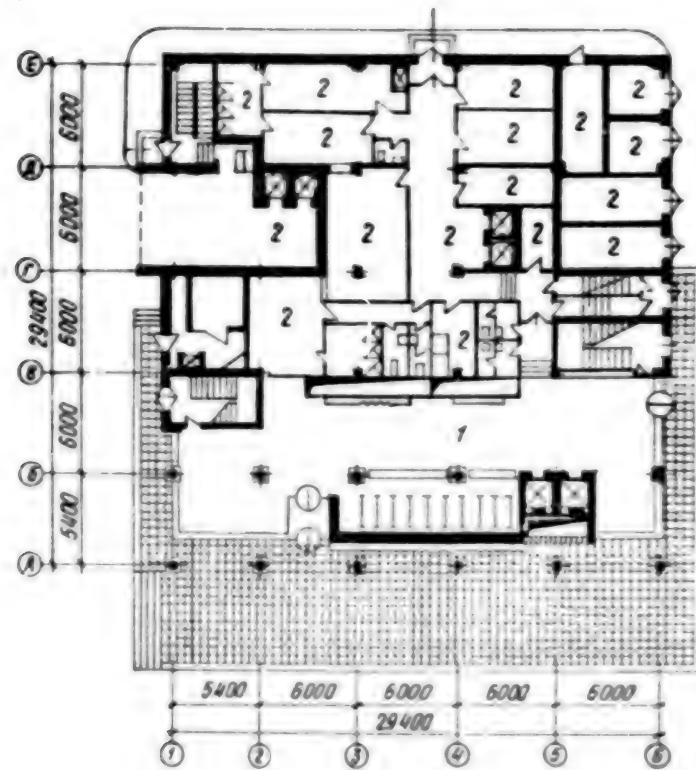
Fourteen floors are set aside for rooms. They are basically for two people and consist of two rooms joined by a common entrance area, toilet and bath. There are also separate semi-deluxe rooms. The rooms have built-in Finnish furniture which creates convenience and spaciousness for the guests.

Despite the fact that the layout of all of the hotel buildings are identical, each was finished in a different manner. Thus gray and white marble was used in the lobbies along with coquina and travertine and floors finished in marble. These materials, which were used in all possible combinations, give each building originality. The quick-serve refreshment bars and halls are also finished differently.

The walls in the guest rooms and entrance areas are covered with washable wallpaper, the ceilings have high quality white water-emulsion paint and the floors are either parquet or carpeted. The door sections are veneered and covered with varnish. The built-in closets are finished in plywood on the inside and painted on the outside. The walls in the utility rooms are faced with glazed tiles and covered with an oil-based paint the same color as the tiles; the floors are finished with ceramic tiles. The service and administrative areas are covered with VA [expansion unknown] paint and the floors are parquet.

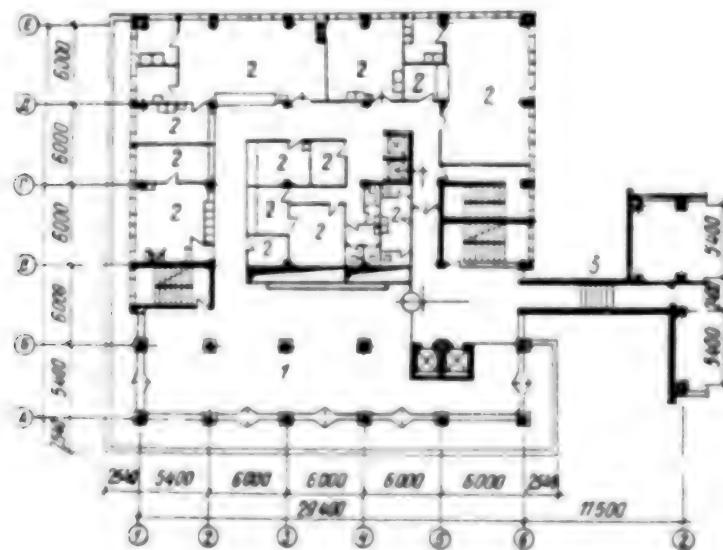
It was decided to plan the eating centers which are designed to serve foreign and Soviet tourists separately. They were designed in the form of compact four-story buildings.

Each center is conceived as a restaurant with a bar and a room that serves a national cuisine. They are laid out in such a way that it is possible to enter the restaurants from the hotel buildings as well as from the street; there is a cloakroom that accommodates 590 people in the lobby--the complete seating capacity of one restaurant. The total seating capacity for the dining areas is based on serving all of the hotel guests.



First floor plan of eating center:

KEY: (1) lobby with cloakroom  
 (2) auxiliary rooms



Second floor plan of eating center

KEY: (1) dining area of the cafeteria with 150 seats  
(2) service rooms  
(3) heated passageway

A cafeteria with a seating capacity of 150 people is located on the second floor, on the third floor is a cafe with 250 seats and on the fourth a restaurant with a seating capacity of 190 people has a banquet hall, stage and dance floor.

Each eating center is connected to the hotel by a heated passageway on the second story level. A hotel guest may get to one of the dining areas by means of a stairway or get on the elevators which connect the rooms in the restaurant.

The lobby and the rooms of all of the eating centers face toward Bol'shaya Yushun' Street. Due to the fact that the lobbies are somewhat lower, porticos were designed for the front of the buildings where tourists may gather before getting on a bus. The adjoining cafeteria rooms exit onto balconies over which the cafe and restaurant rooms are suspended.

Structurally speaking each building was conceived as an intermeshed steel and concrete framework with transversely positioned collar beams. Due to the presence of a steep embankment at the base the foundation was designed as driven steel and concrete piles with a monolithically poured steel and concrete grillage foundation. The distance between the columns in the transverse and longitudinal directions is six meters, their height in the basement and on the first floor is 4.8 meters, on the second, third and fourth floors 4.2 meters, and on the penthouse floor 3.3 meters.

The pattern of the horizontal load and the overall stability ensures that there are rigid connections. The exterior walls are suspended panels made of concrete with porous clay fillers. The roofing is made of unfinished sheet materials.

The structure's specifications called for a decorative approach for the eating centers' facades. They are embellished with artistically created emblems that make these buildings stand out. The restaurant, cafe and cafeteria rooms display a large amount of thinly cut marble facings in the same manner as the balcony in front of the cafeteria. The panels which surround the kitchen area as well as the remaining spaces in the building are finished with glass mosaics. The stained glass panels are made of aluminum.

The interior finish work specifies high quality materials that match the buildings' function. There are many colorful panels in them as well as works of monumental and decorative art. The walls on the first floor are faced with limestone, decorative plaster is used on the stairways and the columns are marble. Glazed tiles are used in the mechanical areas. The floors in the hallways have either parquet or large scale Yugoslavian tiles and the utility room floors are ceramic.

The hotel buildings and eating centers are equipped with all types of modern technological and engineering equipment. The restaurants' commercial areas and the main kitchen area are provided with an air conditioning system. All hotel rooms and services are provided with a telephone connection through the local ATS [Automatic Telephone Exchange].

The site is provided with a network of service roads and passages with areas arranged for transportation to pass through, turn around and stop as well as concrete sidewalks and crosswalks. Public transportation stops are adjacent to the site. A rayon park, which may be used for sport and relaxation, is located nearby.

The Sevastopol' hotel complex was developed by architects V. Khavinoy, I. Elizarova, V. Datyuk and by engineer T. Kizilova, with participation by architect M. Okuney and engineer M. Meshchaninov.

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## METALWORKING EQUIPMENT

### THE USE OF AUTOMATION IN PRODUCTION DISCUSSED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 28 Oct 79 p 2

[Article by I. Nagayevskiy, chief engineer of the Production Association Zhsanovtyazhmash: "The Robot is Knocking at the Door of the Shop"]

[Text] The Production Association Azhanovtyazhmash is one of the country's largest machine building enterprises--tens of thousands of people work here. And it is continuing to be developed. Construction of a number of shops and a foundry complex was begun during the current five-year plan. The new buildings will be outfitted with modern equipment. But at the same time introduction of these capacities also requires additional workers. The workers staff must be increased by almost 3,000 persons now to fulfill the growing program (the mean annual production growth rates comprise approximately 8 percent) and the staff must be increased by 8,000-12,000 for the entire five-year plan. Of course, one must not count on the fact that we will receive an additional work force with the shortage of personnel. This means that there is only one way--maximum mechanization of production processes, especially in the auxiliary sphere.

We long ago turned our attention to the effectiveness of mechanization of auxiliary work. Specialists calculated that 6,500 to 7,500 rubles must be expended to release a single main production worker, while approximately one-third as much must be expended to release one auxiliary worker. And it should be recognized here that we have established a disproportion in mechanization of main and auxiliary operations. Therefore, the specialists have been faced with the problem of not simply reducing the fraction of manual labor, but beginning the struggle for complex mechanization of all processes "from gate to gate": from the arrival of materials to the output of finished products.

A specialized design department of mechanization and automation was created to solve the problem. One of its tasks is to study the experience of the country's leading enterprises and to work out solutions directed toward an increase of labor productivity. The main trends were also determined--introduction of mechanisms in manual operations, reduction of manual labor expenditures in sections already mechanized and replacement of obsolescent equipment with more productive equipment.

Certification of manual and laborious operations was primarily carried out at the association. In practice we now have a complete idea of the ratio between mechanized and manual labor, the number of main and auxiliary workers and expenditures on mechanization and its return. Specific measures have been worked out to eliminate manual labor. They make it possible to free approximately 2,000 persons from heavy and dangerous work and to improve the working conditions of almost 3,000 workers.

A simple rule was initially established by which designers and workers of all shops and services are now guided: a part should not lie on the floor of the shop. After manufacture, it is placed in a container or on a pallet and is sent in them for further machining or to the warehouse. It can be demonstrated that we have posed the task too modestly to ourselves. Moreover, shifting and storage of semi-finished products and complete sets is an acute problem for many machinebuilding enterprises. For example, our association manufactures tens of thousands of parts every day. If their movement and warehousing inside the enterprise is not organized, there can be no talk at all of rhythmic work.

They began with introduction of standardized packaging. Transport and storage of products on pallets and in containers made it possible to utilize all types of transport, to organize clear accounting of freight and to ensure complex-unit-by-unit entry of products into production. There are now more than 30,000 containers with capacity from 250 kg to 20 tons in operation. More than 60 mechanized multilevel warehouses, 25 of which are equipped with stacking cranes, have now been constructed at the association within a short time. As a result, labor productivity for loading-unloading and transport-warehousing operations was doubled and 152 persons were freed from manual labor. It was possible to mechanize the labor of 861 persons last year in total complexity due to introduction of organizational and technical measures alone. The saving comprised almost one million rubles. A total of 59 mechanized production lines is now operating at the association (they numbered only seven several years ago) and seven automatic sections and 47 complexly mechanized sections and seven complexly mechanized shops are in operation.

The problem of mechanization of rail car construction was solved in creative cooperation with the Institute of Electric Welding imeni Ye. O. Paton. The plant specialists together with scientists developed and introduced a high-speed production line conveyor for assembly and welding of the panels of oil-gasoline tank cars. All operations at it have been mechanized and automated. A complexly mechanized section based on seven lines equipped with gas-cutting machines with ChPU [Numerical program control] and with a system of highly efficient transport and loading mechanisms has been developed in the billet section. This made it possible to increase the capacity of billet production by 20,200 tons of billets annually and to release 35 finishers.

Important attention is being devoted to introduction of automated manipulators--industrial robots. These machines replace the manual labor of

people in physically heavy and monotonous operations in casting, forging-press and billet shops and in painting, heat and galvanic treatment of parts, welding and in loading operations.

But it would be incorrect to assume that everything is proceeding without a hitch. Being involved with mechanization, we have encountered difficulties, let us say, until we determine what operations should be regarded as mechanized and which should be regarded as manual. In determining this, we made use of the method in which it is indicated that the equipment adjustors are related to workers who perform their job in a mechanized manner. We have now received form no. 2, confirmed by TsSU [The Central Statistical Administration] of the USSR, where it is said: adjustors are related to workers of manual occupations. There are also fine points in this document which it is somehow difficult to catch. One item, for example, smoothes over the fact that adjustors of automated machine tool production lines engaged in adjustment, aligning and servicing, are related to manual labor workers. And right alongside is the second item: adjustors of automated machine tool production lines engaged in control and observation of their work are related to the category of mechanized labor. One can argue endlessly about these nuances. After all, "control and observation" of automated machine tool production lines is also "servicing" of them. And if this is so, then what is the difference between one and the other adjustors? Why are some related to mechanized and others related to manual workers? This is not an idle question. Not only the indicator of the enterprise's level of mechanization but also the worker's wage depend on an answer to it.

There are also serious deficiencies in complex mechanization of sections and shops. A typical example may be development of the automated machining production complex (ATK). It contains a control computer complex based on M-6000 machines, 12 machine tools with ChPU, an automated transport-ware-housing system and a chip removal system. As we can see, everything here is automated, but operations on installation and removal of parts from the units are preformed by the machine tool operator. And as it is said, a robot is necessary here. Without it the main purpose of automation--an increase of labor productivity and release of workers--remains unachievable.

The robot remained somewhere beyond the plant gates. This occurred because the design of automated production complexes is carried out by institutes of various ministries having their own intra-agency specifications and restrictions and there is no coordinating body. Therefore, there is no standardization of subassemblies, mechanisms and parts. The means of mechanization themselves frequently become morally obsolescent before reaching the enterprise due to the length of manufacture and introduction.

Solution of the problems denoted in the article and other problems would contribute to realization of those propositions on mechanization of manual labor which are contained in the decree of the CPSU Central Committee and the USSR Council of Ministers: "On improving the planning and intensification of the action of the management mechanism to increase production efficiency and work quality."

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